TECHNOLOGY DEPT.

C. E. Wilson: "Why I'm for Controls...for Now"

A McGRAW-HILL PUBLICATION • FIFTY CENTS

SPECIAL ARTICLE FOLLOWING PAGE 80

FACTORY
MANAGEMENT AND MAINTENANCE
OCTOBER 1951

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How to Cure Your Briefcase-itis

PLANT MANAGER

"I've got a pile of stuff to read that's a foot high on my desk right now. I *know* I should read it, but I can't. Too much. Can't even keep up with the 'hot' things I have to read."

PLANT ENGINEER

"Mine's the fastest changing field there is, I guess. Always something new being reported — new controls, new instruments, new materials. Think I can keep up with all the reading needed? Gosh, no! Too much."

PERSONNEL DIRECTOR

"I've got 'briefcase-itis.' Memos, reports, copies of laws — I lug 'em all home. Fall asleep reading the stuff half the time. Wife's fed up. But what can I do? Too much to read in the office."

IF THESE MEN ARE TYPICAL, their problem really isn't what they think it is.

Chances are, they aren't even qualified to decide whether they have "too much" to read.

They simply don't know how to read. If they were *good* readers, they might be able to handle much more.

In other words, in this age of speed and pressure, they're still back in the horse-and-buggy days in their reading.

Here are the sad facts, based on research studies of the reading habits of hundreds of businessmen:

- The *average* executive reads at the level of a 7th or 8th grade child.
- His concentration is poor.
- He tires easily when he reads.
- He overlooks ideas, and distorts details in what he's reading.

For help on how to read better, turn to page 84

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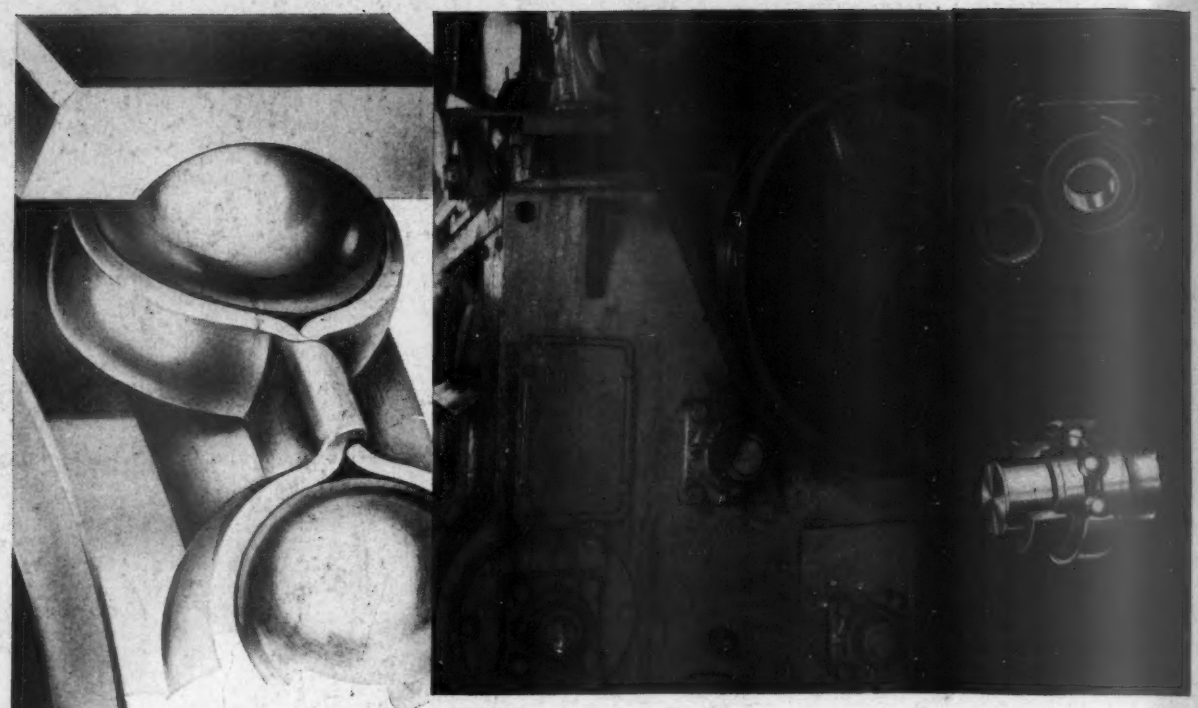

"On the ball" engineering that pays extra dividends today

Fafnir Ball Bearing Flange Cartridges were selected to hold the shaft ends of this metal finishing equipment. The results were . . . simple installation, no costly machining; lower power consumption; protection against #50 steel grit-laden atmosphere; less frequent lubrication.

There's another advantage that takes on extra significance today because of peak production schedules. It's the easy disassembly and reassembly of the Fafnir Wide Inner Ring Ball Bearing with self-locking collar. Replacement of this bearing, if necessary, can be accomplished in the minimum amount of time . . . thus cutting down time to the bone. Perhaps these units can help to lift some pressure from your plant operations. Ask your Authorized Fafnir Distributor. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Rubber highway for bumper-to-bumper traffic

A typical example of B.F.Goodrich product improvement

THOSE curved pieces of steel will soon be gleaming bumpers on new automobiles. But until they are trimmed and polished, they're rough riders on conveyor belts. The plant was using belts without rubber covers, but the sharp, jagged edges of steel used to chew them to pieces in 3 months. And each time a belt gave way in the half mile long "highway", the plant had a traffic jam. That meant a lot of bumpers were late.

Then a B. F. Goodrich man suggested replacing these short-lived belts with an improved rubber belt made by B. F. Goodrich. This belt is built with a tough rubber cover that resists cuts and gouges. And because the belt has this cover on both sides, it can be turned over when one side becomes worn and used for months more.

The B. F. Goodrich belt was installed, has already lasted over a year in round-the-clock service—4 times longer than the uncovered belts previously used. This BFG belt not only saved the cost of 3 replacements but also has saved the cost of lost production during shutdowns.

So whether it's heavy pieces of steel you want to move, or any kind of material—rock, sand, coal, hot coke, ice, lime, potash, or just plain packages—B. F. Goodrich has made improvements in conveyor belting that can save you money. All kinds of industrial products, including hose, transmission belts, V belts, have been made better through BFG research. That's why you're sure of better values in rubber when you call in your BFG distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

FACTORY
MANAGEMENT AND MAINTENANCE

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THE MAGAZINE
OF PLANT MANAGEMENT
FOR 59 YEARS

A McGRAW PUBLICATION

Member of Associated Business Publications and Audit Bureau of Circulations

ARE HIGHLIGHTED HERE

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84 **PLANT EXECUTIVES HAVE LOTS OF "MUST" READING** but not much time in which to read it. At least they think they don't. You'll get two real benefits out of better and faster reading . . . more ideas from reading, more time to read. Try it.

90 **NEW METHODS ARE SO IMPORTANT AT PESCO** that the division president devotes a sizable slice of his work week to the task of coordinating the efforts of the methods group. Here are eight samples of their handiwork—eight ideas maybe you can use.

96 **JUST LIKE THE ZIPPER ON YOUR PANTS** is what they're saying about the Goodrich zipper conveyor system for carbon black. It's better for the product, better for the plant.

100 **BRIDDELL EXECUTIVES WOKE UP ONE FINE MORNING** to learn they had no plant. Blueprints, lists of suppliers, specifications—all gone up in smoke. Most of their machines a total loss. Yet they were rolling again in record time. Here's how.

106 **PRODUCTION ORDERS AND SPOT CHECKS ON QUALITY** are speeded at Bridgeport Brass by pneumatic tubes. Paperwork and metallurgical samples move quickly through the tubes, cutting waste time. System's paying its way in only two months.

108 **YOU CAN'T PLAN FOR YOUR OWN COMPANY'S FUTURE** without knowing the general dimensions of likely changes in business activity. Here are both the short-term and the long-term prospects—as pictured today by McGraw-Hill economists. Figures—and conclusions—make a lot of sense to us. We think they will to you.

113 **GOOD PLANNING KEEPS 250 CRAFTSMEN BUSY** 24 hours-a-day, 7 days-a-week. From Monsanto comes an effective way to schedule your maintenance. The plan isn't complicated. You can adapt it to your own needs. Best of all, there's little paperwork.

126 **IF YOU'RE LOOKING FOR NEW WAYS TO INCREASE OUTPUT**—and who isn't?—you won't want to miss this fourth of four down-to-earth articles on leadership. Series began in July. If you missed first three articles, better look 'em up.

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COMING IN NOVEMBER

NO REASON WHY LITTLE PLANTS CAN'T HAVE BIG-PLANT IDEAS. For proof, see next month's Camera Tour through the Oran plant in Columbus. Oran makes methods changes, buys new equipment, with an eye to the future. One eye? Both eyes!

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PATENTED

Skates go to the rink (and from the store) in this H & D corrugated "luggage" box

It doesn't take an ice skater long to see that this is more than "just a box"—it's also a handy carrier for his skates. The result? Easier sales for clerks who sell Spalding skates packed in this bright, linen-finish corrugated box. Styled like a smart piece of airplane luggage, this H & D box helps provide the "plus" that turns shoppers into buyers.

The H & D Package Laboratory is ready to add a sales "plus" to *your* product, too, by creating a package with after-sales use—or by providing better display . . . cutting wrapping costs . . . giving extra protection . . . increasing multiple or tie-in sales. For free booklet, "Pack to Attract," write Hinde & Dauch, 5105 Decatur St., Sandusky, Ohio.

H&D®

HINDE & DAUCH

Authority on Packaging

FACTORIES IN: Baltimore • Buffalo • Chicago • Cleveland Detroit • Gloucester, N. J. • Hoboken, N. J. • Kansas City, Kan. • Lenoir, N. C. • Richmond, Va. • Sandusky, Ohio St. Louis • Watertown, Mass. Offices in principal cities.

Monarch *CURED-ON* Tires

Soft Touch for Floors

Monarch Tires will save you plenty of money on floor maintenance. Monarch-equipped hand trucks and carts pussyfoot easily over your floors, never groove or chip floor surfaces. Monarch Tires are easy on manpower, too — take bumps smoothly, soak up shock, make casters swivel easily. Be sure the vehicles you buy are equipped with Monarch Tires. Available in oil-resistant synthetics.

The leading manufacturers of industrial vehicles, both hand and powered, use Monarch Tires as original equipment. Replacements available through the manufacturer of your equipment.

THE MONARCH RUBBER COMPANY
350 LINCOLN PARK • HARTVILLE, OHIO

SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

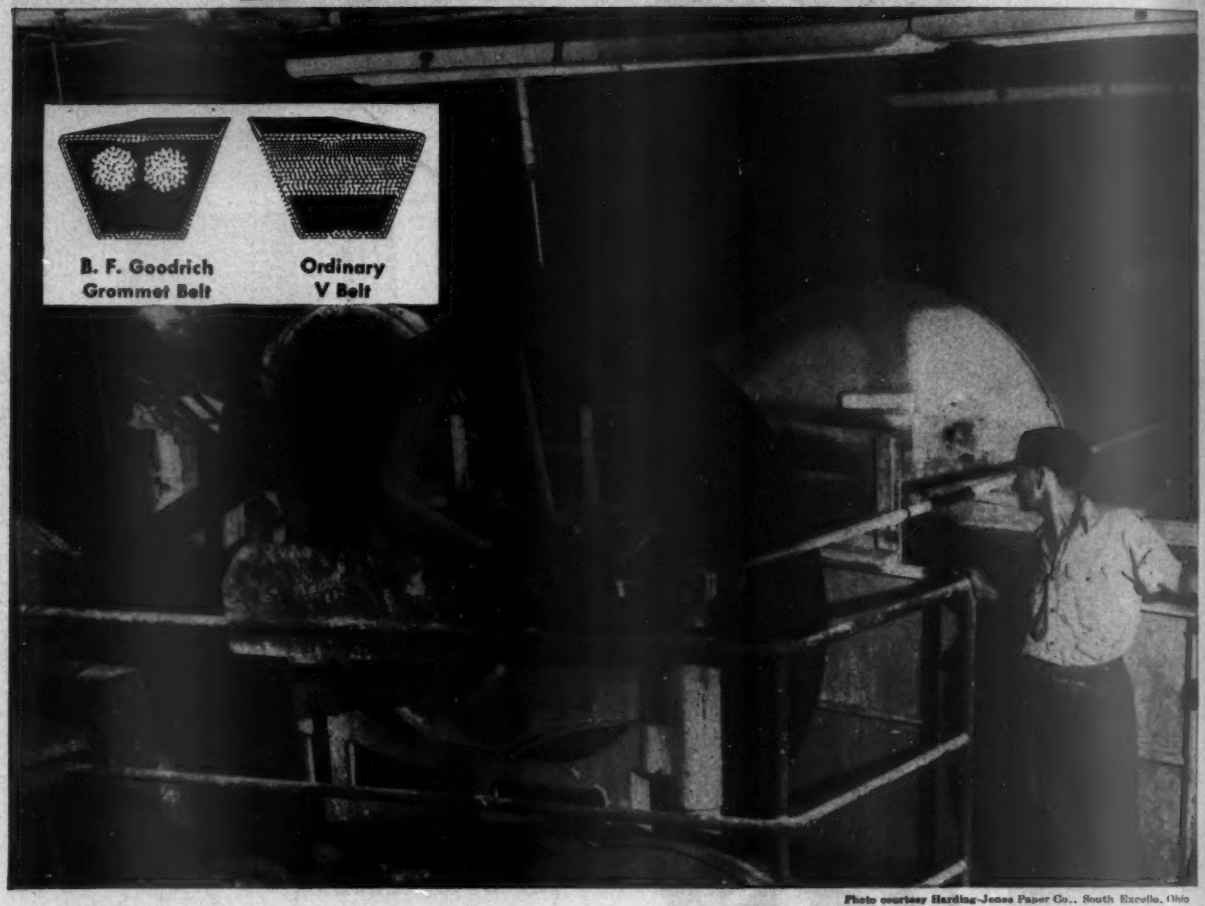


Photo courtesy Harding-Jones Paper Co., South Excello, Ohio

Drive headache cured with B. F. Goodrich grommet belts

B. F. Goodrich grommet V belts cut costs 20 to 50%

HERE was one of the biggest drive problems in this plant. The machine shown in the picture runs 24 hours a day, 7 days a week. Belts previously used couldn't handle the job. Motor bearings were burning out, belts were snapping under the shock load.

Then a B. F. Goodrich distributor suggested grommet belts to stand the jerks and hard pulls. Installed nine months ago, B. F. Goodrich grommet belts are still going strong, and look good for many more months of use. Here's why BFG grommet belts give longer service, save maintenance costs:

Endless — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping cord sections. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless grommet belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet belt is more flexible, grips the pulleys better. Size for size, grommet belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich makes the grommet! — No other multiple-V belt is a grommet belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B.F.Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet Belts BY

B.F.Goodrich

RUBBER FOR INDUSTRY

BAKER TRUCKS require LESS MAINTENANCE

to you this means

- LESS TIME OUT OF SERVICE
- TOP OPERATING EFFICIENCY
- LOWER OVERALL COST

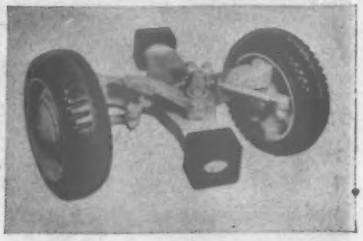
Baker Trucks are engineered and constructed to give maximum trouble-free service, and designed with many features for easier preventive maintenance and quicker, less costly repairs, when necessary. For example:

Electric dynamic braking saves wear on brake linings and protects drive axle and other moving truck parts by smoother, safer deceleration. Service brakes can be adjusted in 5 minutes, and relined in 30 minutes.

Baker exclusive Worm Drive Power Axle has fewer moving parts, is less subject to wear and does not lose efficiency with heavy loads or after long use. Mast assembly can be removed in 20 minutes and power axle pulled in 40 minutes.

Baker Rubber-mounted Trailing Axle is the simplest in use on industrial trucks. Can be removed from truck in less than 20 minutes by disconnecting steering tie rod and removing 8 bolts. Proper steering geometry prevents "scrubbing" of tires and means longer tire life.

Use of jumbo rubber blocks to absorb twisting axle action and road shocks eliminates need for spring connections. Blocks require no attention. Steering connections are above axle where they are protected from damage. Wheel bearings easily examined.



The above are 4 of the 60 illustrations from the new 16-page picture-story manual "Care and Maintenance of Industrial Trucks." *Write for your copy today.*

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
1218 WEST 80th STREET, CLEVELAND 2, OHIO • *In Canada: Railway and Power Engineering Corp., Ltd.*

Baker® INDUSTRIAL TRUCKS

High-speed, high-horsepower drives still running strong after 11 years

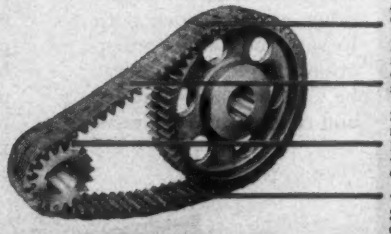
Miami Daily News gets accurate register at 4700 or 3850 ft. per min. chain speeds. Six 100 hp motors are connected through individual Link-Belt Silverstreak Silent Chain and two-speed Herringbone Gear Drives.

LINK-BELT Silverstreak Silent Chain proves low-cost answer to another demanding drive problem

On Jan. 2, 1940, what was then the world's fastest newspaper press began printing the Miami (Fla.) Daily News. Today it's still in use—without a single replacement on its Silverstreak Silent Chain Drives.

And today you'll find Link-Belt Silverstreak Silent Chain doing an efficient, low-cost job on the majority of all high-speed, high-horsepower presses. In fact, wherever a positive, high-speed drive is required, you can rely on Link-Belt Silent Chain.

Remember this—no one chain serves every purpose. That's why Link-Belt builds a complete chain line. No matter what your requirements, Link-Belt offers you the *right* chain to match the specific conditions.



Narrow-width Silverstreak Silent Chain does the job with a *single strand*—eliminating dangers that come with use of multiple belts.

Husky Silverstreak *metal link* construction combines the ability to carry heavy overloads with the resilience that really absorbs shock.

Silverstreak Silent Chain doesn't rely on tension to get pulling power. Chain meshes with teeth—gives POSITIVE drive—no chance for slip.

"Pull" is distributed equally across Silverstreak Chain. No possibility of uneven running—no slapping.

LINK-BELT

One source . . . one responsibility for materials handling and power transmission machinery

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,000

Don't Let Old Methods Hold You Back!

IT PAYS TO KEEP PACE WITH MACHINERY PROGRESS

OLD OR OBSOLETE methods or equipment have no place in your plant in these days of rising costs and manpower shortages. If a new machine can reduce unit costs, the old machine becomes a luxury you cannot afford. Remember that low maintenance and low depreciation rates do not necessarily make a profitable operation.

Profit comes from low unit costs. Any machine or methods that will reduce your unit costs is a good investment. In fact, more and more companies are starting *long term* replacement programs to take advantage of present *and future* technical advances, and reduce unit costs.

Ask an Allis-Chalmers engineer to go over your production set-up with you to see if he can offer a suggestion that will help reduce unit costs. Since Allis-Chalmers builds major equipment for nearly every industry, A-C engineers are especially well qualified to discuss the special problems of almost any industry. There is no obligation.

Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3511A

AirSet and *Vari-Pitch* are Allis-Chalmers trademarks.

Car Shaker

In addition to saving time, Allis-Chalmers Car Shaker eliminates injuries by keeping men out of cars. Used for unloading coal, ore, sand, coke, gravel, and other granular material from drop-bottom gondola cars.

Dielectric Heater

Insulation collars are formed and dried on this press and dielectric heater. Former method required hand forming and ¼ inch thickness. Now same dielectric strength obtained with ⅛ inch thickness.

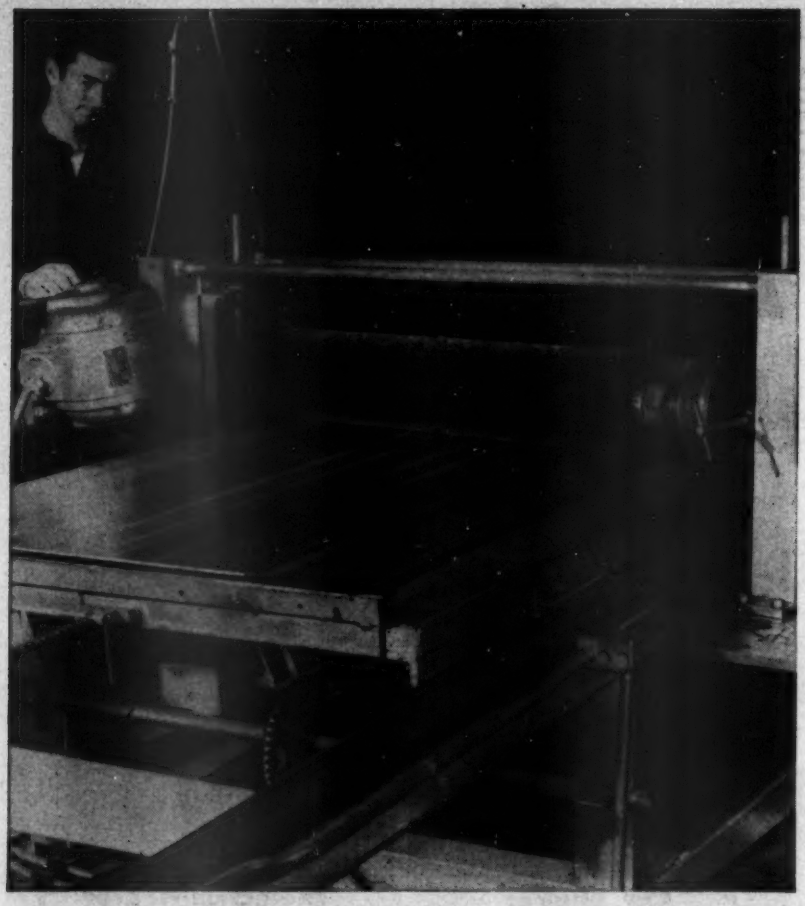
AirSet Roller Mill

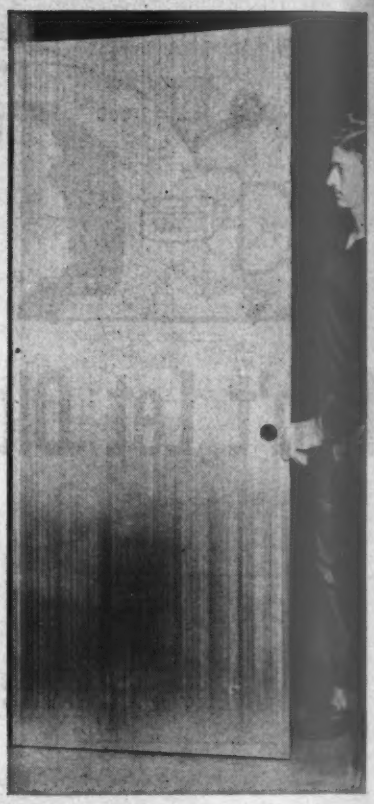
Once roll gap adjustment is made, roll pressure is held constant at both ends by air pressure. Rolls back off and return to position automatically when feed stops and starts. In addition, unit is easy to clean.

Vari-Pitch Sheave

Set speed to fit the job. *Vari-Pitch* sheaves are provided in a variety of types and sizes to provide the speed you need at lowest cost. Used on machine tools, pumps, blowers, conveyors and other machines.

ALLIS-CHALMERS





THE ALUMINUM DOOR

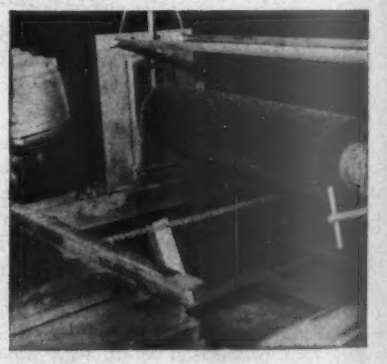
Osborn wire wheel brushes have removed the blemishes and prepared the surface for lacquering.

What takes off the coat and helps the salesmen?

...A brush! Here's a door-way to better aluminum products:

The product is an aluminum door. It was impractical to make lacquer adhere uniformly to the aluminum. With the help of the Osborn Brushing Analyst, a machine using Osborn wire brushes was built to prepare the surface for lacquering. Result: lacquer sticks perfectly to the brushed surface, giving an attractive, durable finish that helps sales.

The Osborn Brushing Analyst is opening the door to lower costs and better products of every description. Have him survey your operations, including cleaning and finishing. Call or write *The Osborn Manufacturing Company, Dept. 545, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



THE BRUSHING MACHINE

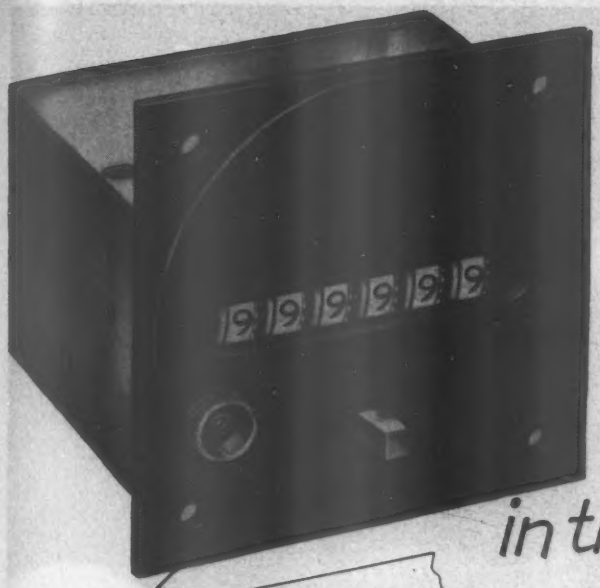
Door is mounted on a conveying table which travels under Osborn brushes mounted as shown. Brush at left brushes side of door. After traveling one way, door is turned over and table reverses.

YOU TOO

can have a simple brushing machine to help you produce better, more salable products. Let Osborn show you how.

OSBORN

LOOK FOR THE NAME OSBORN . . . RECOGNIZED EVERYWHERE FOR QUALITY WORKMANSHIP AND MATERIALS



...and here's a Counter that talks to Jet-Testers in their own language...

Added Evidence that—

Everyone Can Count on VEEDER-ROOT

This technician is reading an electrically operated counter, used to record data in test instruments that check aircraft performance.

And this counter is one of innumerable Veeder-Root specials now on duty in every arm of the service. If you can use such counters (or need counters of special design) on D-O—rated orders, then you can count on Veeder-Root to help you with all possible dispatch.

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"The Name That Counts"
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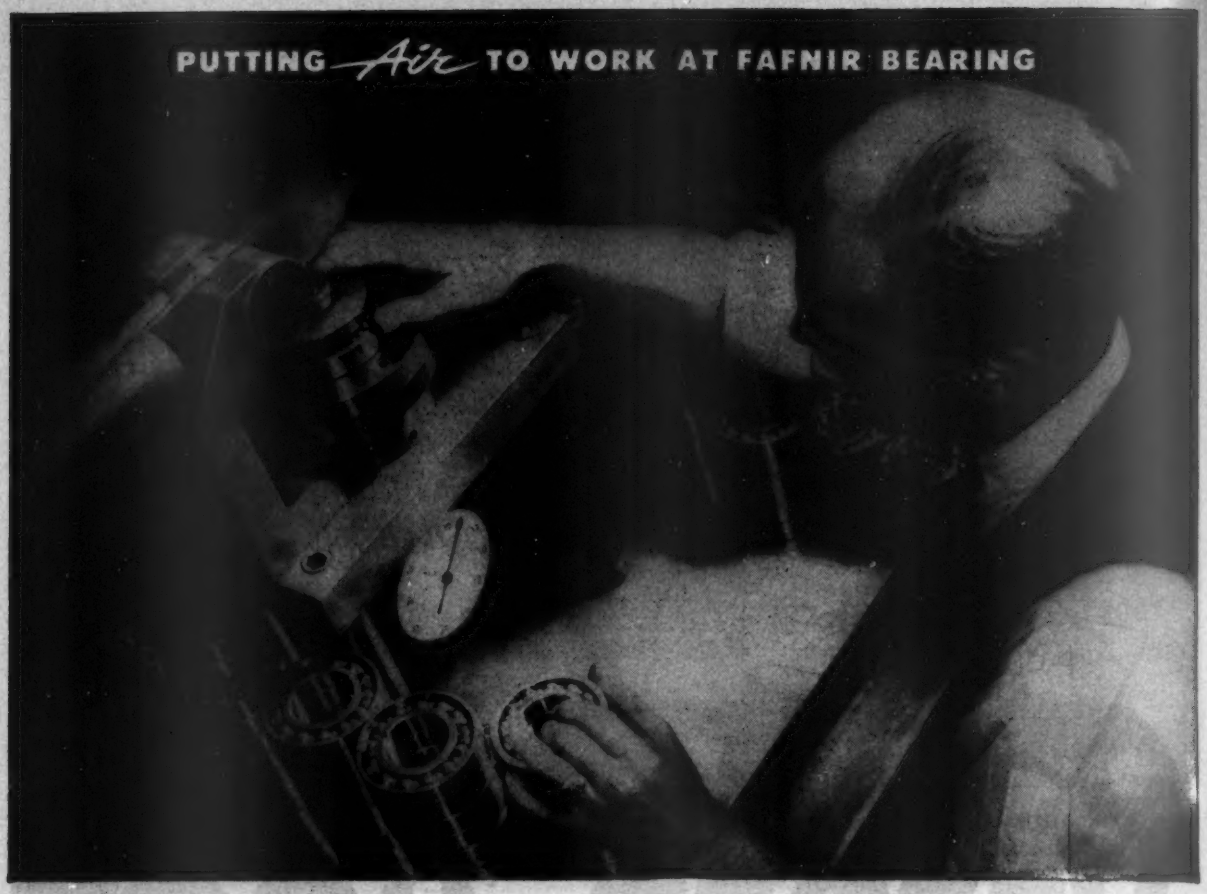
Montreal 2, Canada • Dundee, Scotland
Offices and agents in principal cities

VEEDER-ROOT COUNTERS "Count Everything on Earth"



FINAL EXAM . . .

WHERE AIR CAN FLUNK PRODUCTION

Tolerances to ± .0002" at final inspection are tough to gauge in dust-laden, humid air. A microscopic dirt particle can spoil the work of a hundred hands . . . if it interferes with the precision testing of finished ball bearings at The Fafnir Bearing Company. But Westinghouse *put air to work* . . . to solve their problem with an atmosphere control system, and PRECIPITRON®, the highly efficient electronic air cleaner.

Now, thanks to dust-free air and controlled atmosphere, Fafnir has eliminated those minute, production-crippling dirt specks. Mirror-like finishes on balls and races don't rust or corrode from excess moisture.

If your operations call for close tolerances—for precision machining, grinding, finishing or inspecting—there is industry-proven Westinghouse Air Conditioning equipment ready to help you increase production and cut costs. Call the nearest Westinghouse Sturtevant office, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

YOU CAN BE SURE...IF IT'S **Westinghouse**

PUTTING Air TO WORK

J-80214

PRESIDENT

"Because we use Elwell-Parker trucks, our product is not loaded with high handling costs due to expensive manual labor."

PRODUCTION MGR.

"Elwell-Parkers prevent bottlenecks by synchronizing the flow of materials to and from inter-related machinery."

from any point of view...

ELWELL-PARKERS

are preferred!

CHIEF ENGINEER

"Several of our Elwell-Parkers have served over 20 years, with much less maintenance. They are well-built and wearing parts are surprisingly accessible."

PURCHASING AGENT

"I have never regretted ordering Elwell-Parkers. Even though they cost a little more, they always make good."

DEFENSE WORKER

"I'm back again—driving the same Elwell-Parker as in World War II. My truck is always ready and is so easy to operate."

SAFETY DIRECTOR

"Lifting accidents just about disappeared when E-P trucks replaced *muscle power.* My drivers carry the E-P Safety Folder."

FREE HANDBOOK

on Scientific Materials Handling. Ask for a copy of "Industrial Logistics" naming your product. Write The Elwell-Parker Electric Co., 4029 St. Clair Avenue, Cleveland 3, Ohio.

ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

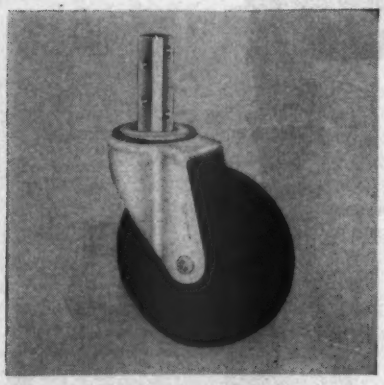
Established 1893

Caster Quiz

A "quick facts" feature with helpful suggestions on the use of casters . . . to reduce materials-handling costs, the "Reducible 30%."*

Q Are standard casters made that are easy to mount on equipment with pipe legs?

A Yes. The Bassick Co. manufactures casters with threaded pipe sockets, with wheels ranging from 3 in. to 8 in. diam. There are sizes to fit pipes of ¾ in., 1 in., 1¼ in. and 1½ in. diam. For lighter equipment, Bassick Casters are available in types to fit inside many sizes of pipe legs and steel tubing.

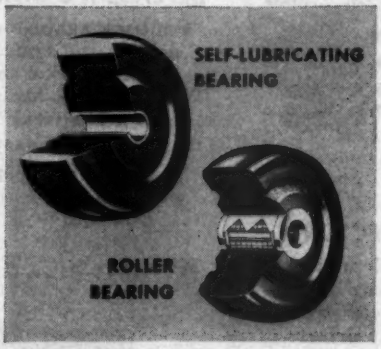


Q Are casters available that can readily be fastened to equipment with angle-iron legs?

A Yes. There are standard Bassick Casters with octagon stems to bolt or rivet to the inside of angles. Wheels range from 2½ in. to 8 in. diam. The Bassick Co. also makes a variety of angle brackets, for easy application of stem casters with wheels from 1¼ in. to 5 in. diam.

Q Can swivel casters be held in fixed position?

A Yes. Many types, especially Bassick Heavy-Duty Casters, with 5 in., 6 in., 8 in. and 10 in. wheels, can be supplied with swivel locks. These easy-to-operate locks hold the swivel rigid until released, are a big aid in steering trailers or dollies that must be equipped with all swivel casters for easy maneuverability in confined areas.



Q Are roller or ball-bearing wheels essential in casters?

A No. They usually provide easier starting and rolling, but do not increase the caster's load capacity. There are many operating conditions where plain bearing metal wheels or self-lubricating bearing composition wheels are perfectly satisfactory, more economical. *Most important today* (because of critical shortages of roller bearings), casters so equipped can be delivered far more promptly.

Q Where can Bassick Casters be bought?

A At selected local industrial distributors, stocked to serve you. Look for your nearest one in the classified phone directory, or write Bassick for this information.

THE BASSICK COMPANY, Bridgeport 2, Conn. Division of Stewart-Warner Corp. *In Canada:* Bassick Division, Stewart-Warner-Alemite Corp., Ltd., Belleville, Ont.

**According to cost analysts, materials-handling (about 30% of total cost) affords about the only real opportunities for cost reduction today.*

SEE OUR CATALOG IN SWEET'S

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MAKING MORE KINDS OF CASTERS ... MAKING CASTERS DO MORE

with the GREATEST $$$ ER
American Industry Ever Knew... in Materials Handling Operations

√ MOVES TONS OF YOUR PRODUCT AT THE TOUCH OF A BUTTON

Forward and reverse control buttons are two-speed ... controls operate from any position. Release of handle applies positive mechanical safety brake.

√ NEW "ARMORED" POWERHEAD DEFIES DESTRUCTION

All operating parts of this new electric truck are "armored" against shocks and bumps, by a heavy cast powerhead housing ... yet easily accessible for quick servicing.

√ NOW SO COMPACT IT TURNS WITHIN ITS OWN SHADOW

"101" TRANSPORTERS are designed for utmost maneuverability. They slip in and out of the tightest aisles. These new "101" TRANSPORTERS turn within their own length.

√ NEW MOTOR—SAME SIZE, BUT 20% MORE EFFICIENT

New field-tested motor has been stepped up to deliver 20% greater efficiency. This means lower current consumption—more ton miles per KWH.

No wonder there are more Automatic TRANSPORTERS in use today... than any other operator-led Electric Trucks!

Yes, every day ... different American Industries everywhere, report material handling savings up to 75%!

Small wonder management is so enthused about cost-cutting "101" TRANSPORTERS. These mechanized cost savers not only speed production and boost shipments—they also eliminate back-breaking, old-fashioned hand handling—*actually release manpower for more productive work*! It doesn't matter whether you employ as few as 3 men in materials handling operations, the rugged "101" Transporter will save you money. Send for the facts today—mail coupon below!

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Please send me complete facts about your new "101" TRANSPORTER, with FREE booklet: "How to Make Your Material Handling Pay Dividends."

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By.....Title.....
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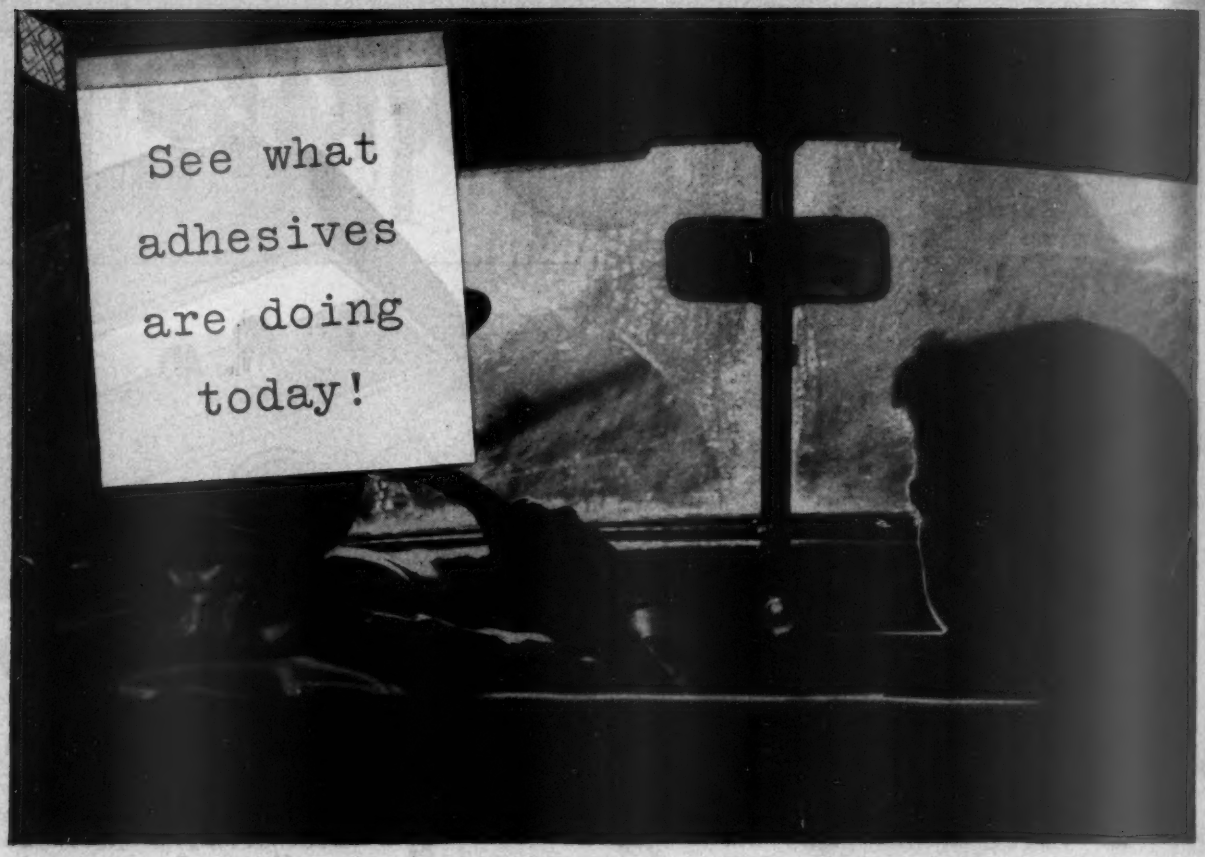

Mastering motor-made hurricanes

Did you ever stop to think that when you drive 60 miles per hour in a rain storm, the rain is hitting your windshield with almost hurricane force? Mastering these motor-made hurricanes is another specialty of 3M adhesives and sealers.

Sealing an automotive windshield requires outstanding performance from any sealer. It must bond the glass securely to rubber. The sealer must stand up under hot summer sun and zero winter cold. It must be impervious to moisture, and neither swell nor shrink under all driving conditions. By performing this exacting job on your car, a 3M sealer assures you of driving comfort the year around.

Making top-quality adhesives, coatings and sealers that successfully meet such tough requirements is 3M's specialty in the adhesives field!

See what adhesives can do for you . . .

Many manufacturers have found that adhesives aid in product improvement. Contact your 3M field engineer. He will be glad to examine with you the possibilities of adhesives in your business. Or, write directly to 3M, Dept. 310, in Detroit.

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is used by Allis-Chalmers to make Pump-Testing More Efficient

One of the world's largest makers of power machinery scientifically utilizes energy in color to make working conditions safer and more pleasant

THE many ways in which workers and management alike benefit by the use of Pittsburgh COLOR DYNAMICS are again demonstrated in the pump test department of the Allis-Chalmers Manufacturing Company, of Milwaukee, Wis. This organization is one of the world's greatest producers of agricultural, industrial and electrical power machinery.

● **Allis-Chalmers'** satisfactory experiences with COLOR DYNAMICS is best summarized in this comment by Carl E. Meyer, manager of the Department of Buildings and Properties:

● **"Our pump test floor** is just one example of how Allis-Chalmers is making use of the *energy in color* in various of its plant areas to help promote greater efficiency as well as to make working conditions better and safer. With *focal* and *eye-rest* colors on walls we believe that we have lessened eye strain for employees who are almost continuously engaged in reading automatic recording instruments. We have also used *morale-building* colors in various areas to provide more attractive surroundings that improve the worker's attitude toward his task.

● **"We have** marked accurately all control and hazard areas in order to lessen the danger of accidents. We have also used a distinctive set of color markings on containers that hold hazardous materials as well as pipe-markings to distinguish carriers of various kinds of liquids.

● **"As a result** of this painting, workers take greater pride in their surroundings. They keep their working areas cleaner, thus simplifying housekeeping problems."

● **Why not try** COLOR DYNAMICS in your plant—on a machine or two, or in one department—and see the difference it makes?

Here's How You Can Get A Color Engineering Study—FREE!

● **For a complete analysis** of Pittsburgh COLOR DYNAMICS and how it works, write for a FREE copy of our booklet explaining this painting system. Or better still, ask us to make a scientific color engineering study of your plant for you free and without obligation. There's a trained color expert at each of our 75 warehouses. Call your nearest Pittsburgh Plate Glass Company branch and arrange to have a representative see you at your convenience. Or mail the coupon below.

Mail this coupon for FREE BOOKLET!

Pittsburgh Plate Glass Co., Paint Div., Department FM-101, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your new revised and enlarged Booklet, *"Color Dynamics In Industry."*

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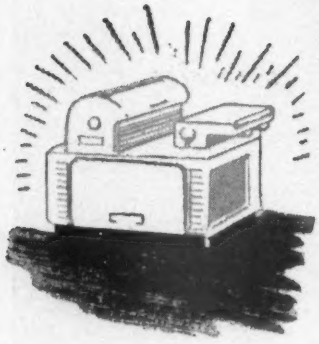
HELPS YOU IMPROVE YOUR PRODUCT



New materials and better manufacturing methods contribute improvement to a product no less than new and better design. How can the manufacturer know when there is something new that applies particularly to his product or operation?

Just leave the door open and a man will call to tell all about the new things—machines, materials and methods—in modern manufacturing. Often he will bring to your attention something that is "right up your alley". It is his business to know, and he is constantly on the lookout for new things you can use.

If you don't want to wait for his call, phone him.

Responsible

"This man" is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog.

There are approximately 2000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than $3,000,000,000. They carry an average inventory of $500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.

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easy access prevents trouble with this valve

Remove just two nuts to dismantle this gate valve for inspection, cleaning, or repairs—without taking it from the line. Reassemble just as easily, knowing that Crane clamp design keeps the bonnet joint snug and accurately aligned. Use Crane Clamp Gates on steam, water, and air, but especially in heavy fluid lines needing periodic cleanout. They'll save time, labor, and encourage regular servicing that prevents valve trouble.

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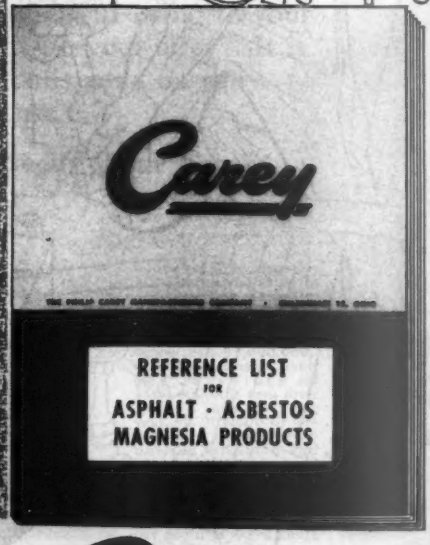
His training and experience make him your valuable ally in the solution of problems in building construction and maintenance—manufacturing and process operations. Call him in to show you how Carey products can help you get the job done, *faster*—for less!



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Lockland, Cincinnati 15, Ohio
Department F-10
Gentlemen: Please rush me my free copy of the Carey Reference Manual for Asphalt, Asbestos and Magnesia Products.

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It's more than the Best Paint on the Market...

It's the Best Paint On the Wall!

There's only one true way to test the real quality and value of a paint. It's the *on the wall* test . . . the simple, inexpensive test that tells you, *in advance and in no uncertain terms,* what a paint will do and what it will cost to do it.

All you do is take a gallon of Barreled Sunlight and a gallon of any other good paint. Thin each according to the directions on the cans. Then cover test areas with each paint . . . measuring the square feet covered by each, comparing the hiding properties of each and — because labor represents a good 80% of the cost of any paint job — carefully check the time involved in applying each.

We'll wager dollars to doughnuts that in such a test Barreled Sunlight proves best. Yes, best in performance *on the wall* . . . tops when it comes to giving you a better looking, longer lasting paint job at the lowest possible cost!

Talk it over with our representative. He'll pay a friendly and constructive call at your request. Write today.

BARRELED SUNLIGHT PAINT COMPANY, 2-J Dudley St., Providence, R. I.

Barreled Sunlight *Paints*

In whitest white or clean, clear, wanted colors, there's a Barreled Sunlight Paint for every job

IT ALWAYS COSTS MORE NOT TO PAINT!

For over half a century the symbol of quality and dependability among paint buyers for leading industrial, institutional and commercial buildings

Why it pays to standardize on the Link-Belt BULK-FLO . . . .

The BULK-FLO feeds . . . conveys . . . elevates, providing more profitable handling of hundreds of materials

Difficult-to-handle bulk materials are moved safely and economically with the Bulk-Flo. The Bulk-Flo, most versatile type of conveying medium on the market, serves as a feeder, conveyor and elevator under one drive. The same unit can combine horizontal, vertical and inclined paths, often replacing several units, in less space and at lower cost. Multiple feed and discharge points are practicable. It is completely enclosed—dust tight.

Operating independent of internal pressure, the Bulk-Flo, *with solid flights,* need not be operated at full capacity to provide positive movement of materials. Regardless of the amount of feed, it is self-clearing.

Bulk-Flo provides gentler handling. Because of its solid flights, there are no annoying updrafts of air. Avalanching is eliminated. Variable speed drives are not necessary, because the capacity can be varied by regulating the feed.

You can be sure, when our specialists recommend Bulk-Flo to your engineers or designing contractor, that it is the *right* conveying system for your needs, because Link-Belt makes *all types* of feeding, conveying and elevating machinery—the only complete line on the market today. For all the facts, write for Book 2175.

Full or partially loaded, Link-Belt Bulk-Flo with solid flights provides positive, gentle material handling.

Bulk material handling is easier and safer with BULK-FLO

- Unit is self-clearing through intermediate runs.
- Minimum degradation of materials.
- Dust-Tight construction. Can also be made vapor-tight and liquid-tight.
- Handles batches on cycle operations.
- No contamination from lubrication.
- Chain and casings can be galvanized or made of alloy metals.

LINK-BELT

BULK-FLO
FEEDERS - CONVEYORS - ELEVATORS

Standard combined-run, L-path arrangement Bulk-Flo with single feed opening and front-discharge head section. Side discharge head section may also be used.

LINK-BELT COMPANY: Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities. 12,382-C

THESE ARE AMERICAN

Type 23 Thread-Cutting Screw
. . . for Metals

Wide thread-cutting slot . . . providing greater chip-space . . . makes these screws *top choice* for cutting soft metals like zinc and aluminum . . . in which they cut a standard machine-screw thread. And they may also be used in harder metals. *Another* American cost-cutter!

Type 25
Thread-Cutting Screw
. . . for Plastics

Again the wide thread-cutting slot, affording greater strength to the fastening . . . but here, combined with a wide-spaced thread . . . to give this screw all the operating characteristics required for smooth, fast fastenings in plastics (without any need for threaded inserts). Here is *still another* American cost-cutter . . . from the complete, modern American Line of Screws and Bolts.

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FOR drills to fit your needs—for top performance on any portable drilling job—it pays to check Black & Decker *first!* That's because Black & Decker gives you an unmatched choice of Drill models. Capacities from ¼″ to 1¼″—choice of handle arrangement for easiest operation—choice of speed, power and price in most capacities. And it's also because Black & Decker Drills give you powerful B&D-built motors—full ball-bearing construction—extra-tough gears, shafts and chuck spindles—husky housings, streamlined design, perfect balance.

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"WE SAVED 48 MAN-HOURS on the 90 man-hour job of steamcleaning, rewiring and painting an overhead crane at our South San Francisco plant," says Fred Reibin, Plant Engineer, Enterprise Division, General Metals Corp.

25 ft. "UP-RIGHT" SCAFFOLD-ON-WHEELS

Set up in only 5 minutes!

As if by magic, an aluminum alloy tower of any height desired is ready in minutes! Individual scaffold sections are set one on top of the other. Sections lock into place instantly. The tower rolls down aisles . . . straddles machinery.

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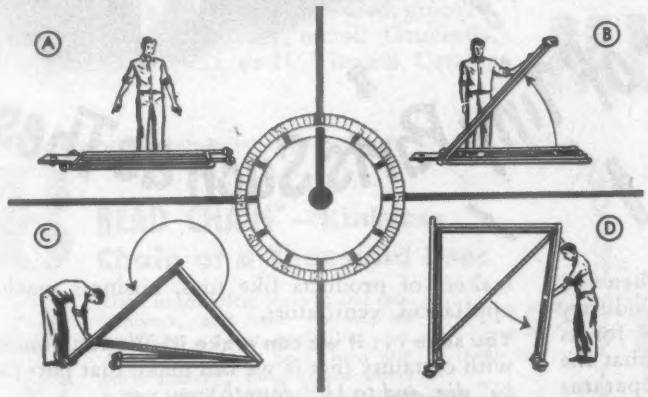
Patented ONE-PIECE SECTIONS

Each one-piece section is unfolded by one man in less than a minute! No tools, wing nuts or bolts.



Your maintenance costs can be reduced by "UP-RIGHT" SCAFFOLDS

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We may KNOCK YOUR HAT OFF

with our Quote on SAVINGS AND DELIVERY

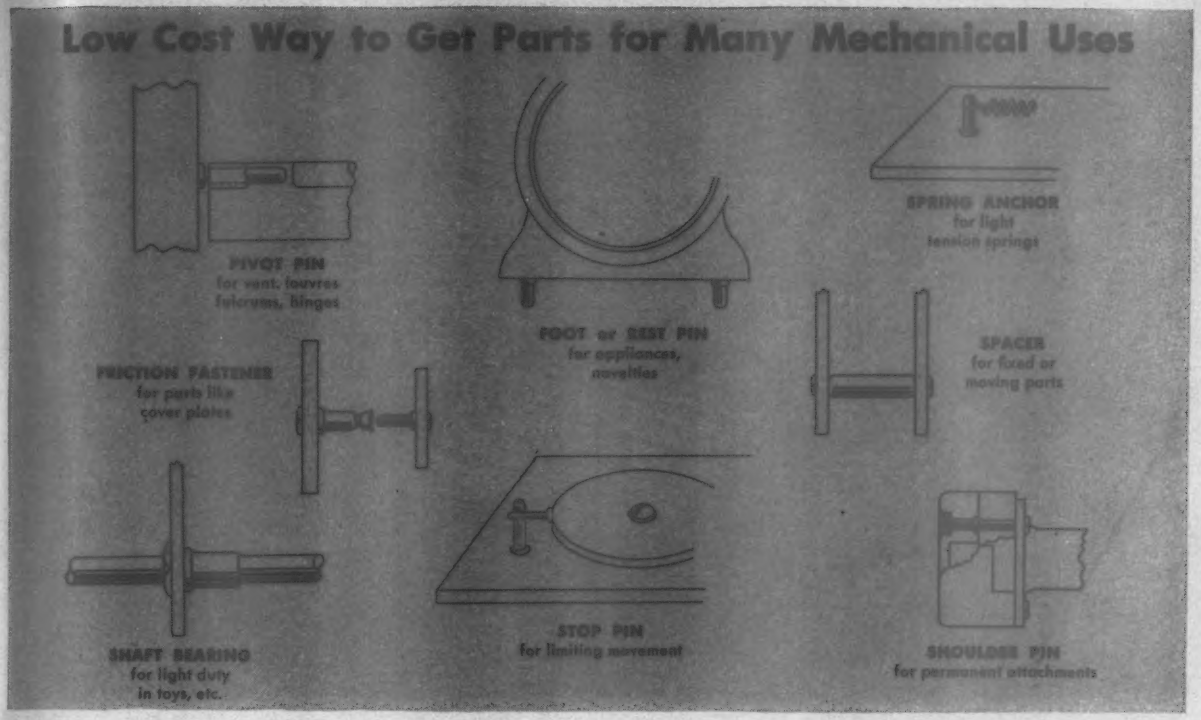
If you're a Big User of Tiny Parts Such as These!

Sound like exaggeration? Not when you know that the electronic tube industry looks to The Bead Chain Mfg. Co. for its millions of radio tube pins. Or, that the economy-minded builders of electrical apparatus turn to us for the contact pins, terminals, jacks and sleeves required in tremendous quantities.

For pin-like parts, and variations of bushings needed for *mechanical* purposes, as well, we are the money-saving supplier to scores of famous makers of products like toys, business machines, appliances, ventilators.

You save . . . if we can make it! We can almost say with certainty that if we can make that part *(up to ¼" dia. and to 1½" length)* you use in large quantities, we can show you a big saving. And, assure on-time deliveries to meet your defense work schedules! We have something unique back of that claim . . .

Low Cost Way to Get Parts for Many Mechanical Uses



Nobody has What We Have! To be able to produce our famous Bead Chain to sell for pennies per yard, we had to develop *our own* equipment and method ... our *Multi-Swage Method.*

Instead of turning and drilling parts from solid rod, or stamping and forming them, our Multi-Swage Method automatically swages them from flat stock into precision tubular forms, with tight seams. By increasing the production rate many times and eliminating scrap, this saves a large part of the cost by other methods.

What We Can Make. Parts may be beaded, grooved, shouldered, and of most any metal. Generally, should not exceed ¼" dia. or 1½" length. Catalog shows many *Standard Items* available in small quantity. *Special Designs* must usually be ordered in lots of a half-million or more, unless they are frequently reordered.

Get Cost Comparison. Send blueprint or sample and quantity requirements. Our engineers will return an eye-opener on economy.

Let **BEAD CHAIN** *make it by the*

MULTI-SWAGE METHOD

BEAD CHAIN®—Kinkless Chain of a Thousand Uses

Used in countless ways to add convenience, and sales features to products . . . at negligible cost. Always the finest pull chain and parts retainer. Bead Chain offers widest choice of bead sizes and shapes, metals, colors, attachments and fittings, and experienced application aid.

I want this Catalog — Data Folder

The Bead Chain Manufacturing Co.
38 Mountain Grove St.,
Bridgeport, Conn.

Name, title.....

Company.....

Address.....

Original 1500-kva single-ended G-E load-center substation installed on plant roof to conserve valuable floor space.

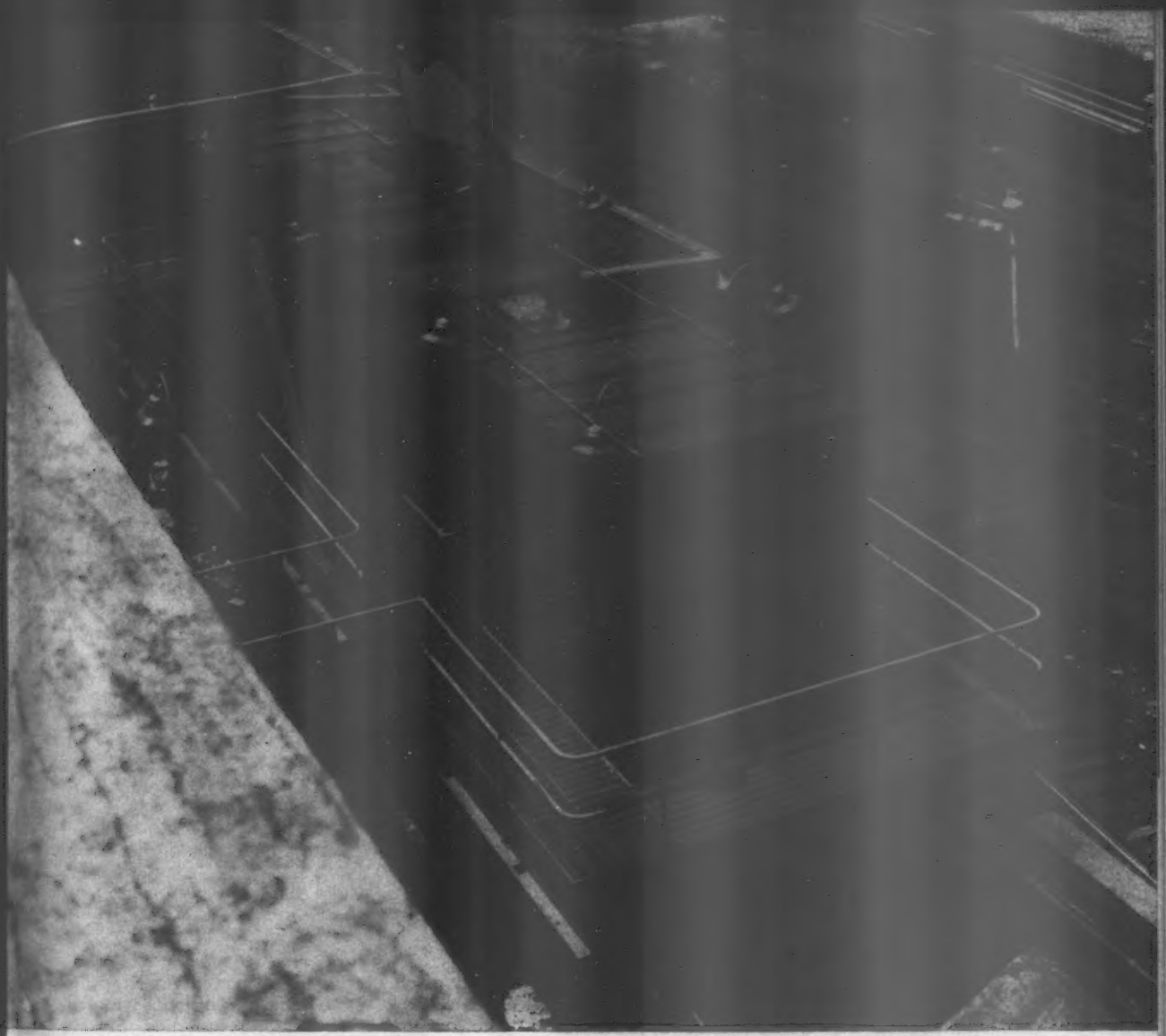
Foresight that paid off

POWER DISTRIBUTION SYSTEMS

Some time ago, an Eastern industrial put in a G-E load-center distribution system, knowing that the load served by one of its substations (above left) would probably double within five years. It actually doubled after *one* year.

With any other type distribution, the company would have eventually needed a bigger transform taxing the interrupting capacity of existing circ breakers. Or had the original unit been twi needed size, investment would have been ha wasted for one year. Instead, the company wait until load doubled, then added another "buildi block" of power of the same economical size, kee ing cost-per-kva at optimum. This load area is no fed by two 13,200-volt feeders, one to each tran former, for greater reliability.

What's more, the new substation was installe



Recent addition of second 1500-kva substation, installed beside original one. Load area is now reached by two high-voltage feeders.

when power needs doubled

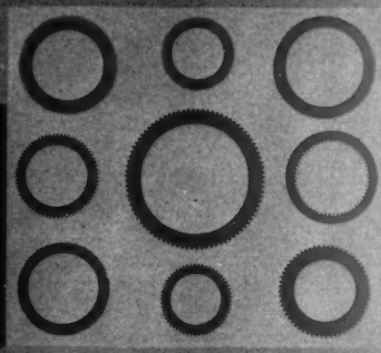
onnected and energized without disrupting existg service. *Nothing already done was undone.* Your earest G-E sales office can help you find the best way to distribute power in *your* plant during these years of expansion. *General Electric Company, Schenectady 5, N. Y.*

854-40

GENERAL ELECTRIC

2,000 Clutch Plates Punched Per Shift with SPECIAL STEELWELD PRESS

Punching gear teeth in clutch plates on Model K4-4 300-ton Steelweel Press.



Some of the many plates punched on the Steelweld Press, ranging from 11¾" to 22¾" diameter, all of .089 steel.

Versatility of the Steelweld Press design is convincingly demonstrated at the S. K. Wellman Co., Cleveland, where a machine, adapted for punching purposes, turns out 2,000 clutch gear rings per eight hour shift. Equipped with a specially wide bed and ram for accommodating the dies, and vertical tie rods at front for securing necessary rigidity, the design provides an economical press with stamina required for heavy-duty service.

Installed late in 1949, the machine has been in nearly continuous operation ever since, working 24 hours a day, six days a week. A large variety of clutch plates are punched. The largest is 22¾" O.D. of 13-gauge steel, with all teeth on the outside being punched at one stroke. The heaviest clutch plates punched are of 11-gauge steel. Multiple punching and notching are also done. The gear ring discs and washers are usually run through in lots of 4,000 to 25,000 at a time.

Because of satisfaction with this press, Wellman has purchased another larger Steelweld Press to help satisfy the growing demand for "Velvetouch" clutches, plates, facings and brake linings, used widely on tractors, trucks and heavy industrial equipment.

GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

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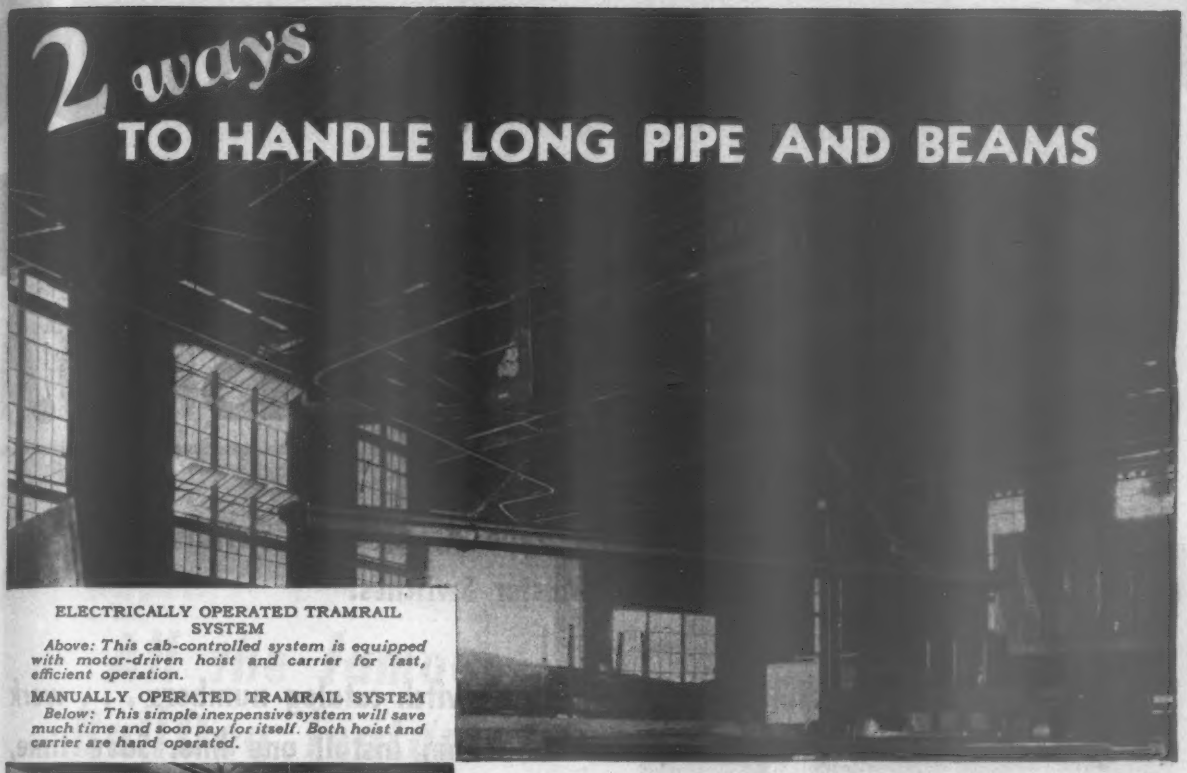
BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

2 ways TO HANDLE LONG PIPE AND BEAMS



ELECTRICALLY OPERATED TRAMRAIL SYSTEM

Above: This cab-controlled system is equipped with motor-driven hoist and carrier for fast, efficient operation.

MANUALLY OPERATED TRAMRAIL SYSTEM

Below: This simple inexpensive system will save much time and soon pay for itself. Both hoist and carrier are hand operated.

Long pipe, beams and metal stock are heavy and awkward to handle by hand or on floor conveyances. It is difficult to haul them through narrow shop aisles and around corners. In many instances it is necessary to reload onto different types of conveyances in order to overcome floor obstacles and reach the ultimate delivery point.

Cleveland Tramrail materials handling equipment simplifies the transportation of unwieldy materials within or between plants, because it operates overhead above and away from floor obstacles and traffic. It hoists and delivers the materials direct from point to point without in-between handling. Illustrated are two types of overhead materials handling systems for conveying lengthy items. Other manually or electrically operated equipment is built to suit individual requirements.

Now is the time to consider methods of improving plant efficiency. A discussion with your local Cleveland Tramrail engineer may start you on the way to greater production, lower costs, improved safety and other advantages possible with a good overhead system properly engineered.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3258 EAST 234TH ST. . . WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

NOW...STOCK AND USE B MASTER SWITCH FOR A APPLICATIONS . . A

YES! **Now you can fill any need for Type A, C, or D switches from one magnificent line of BullDog Vacu-Break Master Switches.**

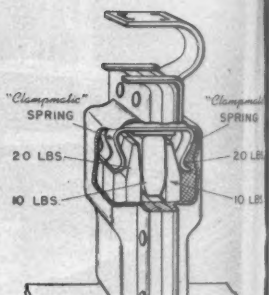
NOW! **End chaos of hundreds of confusing switch catalog numbers . . . *work with just 38!* Order from one line, stock one line, install one line. Save time, money, effort wherever you use safety switches.**

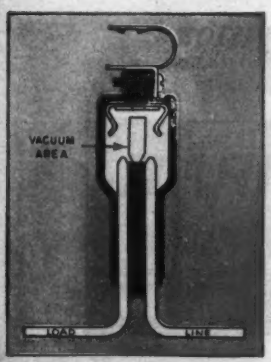
NOW! **A great, tested BullDog switch that fills all Type A specifications, yet sells at C prices, to end today's switch turmoil and streamline your use of Type A, C, and D switches!**

Another great BullDog first!

Exclusive Clampmatic Contacts!

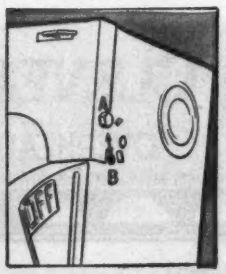
"Clampmatic" is a method for obtaining extra and enduring contact pressure between switch jaws and blades. In ordinary switches, new jaws exert about 10 lbs. pressure on blade. But in Vacu-Break Switches, the strong steel Clampmatic spring augments this with 20 lbs. on both "line" and "load" sides of jaws. Thus, Clampmatic provides a total of 30 lbs. of contact pressure between both sides of blade and jaw for "bolt-tight" contact.





Exclusive Vacu-Break Principle!

Dangerous arcs are quickly snuffed out by lack of oxygen in BullDog's exclusive Vacu-Break arcing chamber. This eliminates excessive arcing which, in ordinary switches, causes burning, pitting and rapid deterioration of contacts.



Voidable Cover Interlock!

Interlock: With interlock pin at Hole A, cover cannot be opened unless switch is OFF. Cover must be fully closed to throw switch ON.

To void interlock: Simply push interlock up and insert interlock pin in Hole B. Switch can then be thrown ON or OFF with cover open or closed.

BULLDOG VACU-BREAK ALL TYPE A, C, AND D AT TYPE C PRICES!

All the famous BullDog features!

- ✓ Vacu-Break principle of circuit rupturing
- ✓ Self-aligning Clampmatic Contacts
- ✓ Quick-make and quick-break
- ✓ Anti-creepage corrugations on switch bases and arc chambers
- ✓ Solderless cable terminals (Wire Grips)
- ✓ Horsepower-rated . . . Standard and Conditional
- ✓ Silver-surfaced current-carrying parts
- ✓ Voidable cover interlock
- ✓ Spring reinforced fuse grips
- ✓ Ample supply of conveniently located concentric K.O.'s
- ✓ Rear wiring gutters in 400-ampere and larger switches
- ✓ Generous wiring space in all switches

REMEMBER! Just 38 great Master Vacu-Break Switches replace hundreds of Type A, C, and D safety switches!

WRITE DEPT. 453-B FOR DESCRIPTIVE FOLDER

BULLDOG

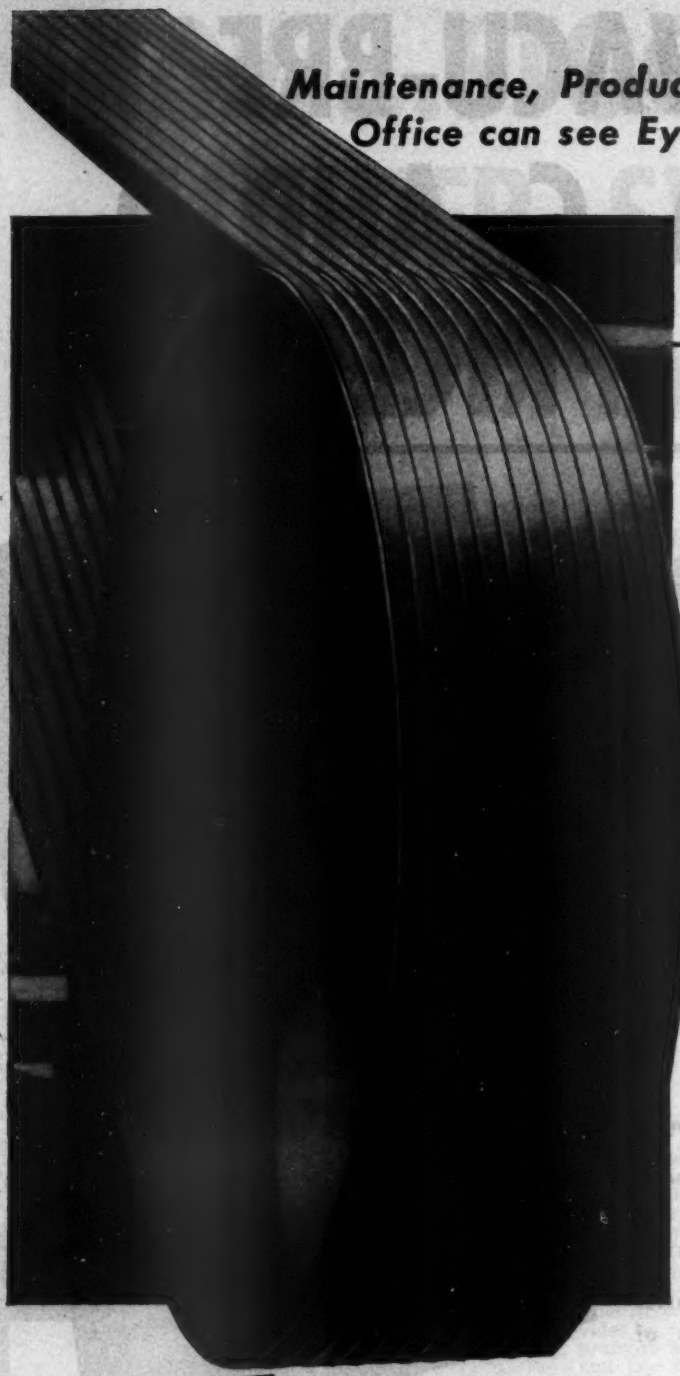
BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

THE LEADER IN FLEXIBLE ELECTRICAL DISTRIBUTION

Maintenance, Production, Purchasing and Front Office can see Eye to Eye on this "Baby"



It's a TOUGH, LONGER-LASTING BULL DOG V-BELT!

Yes, a Bull Dog V-Belt has something for everybody. Your engineers and production heads who have enough on their minds already with shortages and the necessity for increased output will appreciate the SPECIALLY ENGINEERED BWH CORD SECTION and its high tensile strength. They'll get the superior load carrying capacity from BULL DOGS and the ability to absorb shock loads that's needed.

Your maintenance men (engineers, too) will note the QUALITY CONTROLLED COMPOUNDS developed by BWH which run cooler and do not crack or deteriorate under severe flexing. They'll probably note also the MINIMUM STRETCH — due to a new and exclusive technique in processing Bull Dog Cords. They'll be *sure* to note the less slippage, fewer adjustments, longer belt life that results.

Your maintenance men will also okay the Bull Dog V-Belt's DURABLE COVERS. They're made of closely woven, heavy, bias-cut fabric that takes the torturous wearing action where the belt meets the sheave — seals it against the penetration of dirt, grease and moisture.

With it all adding up to less money *out* in belt repairs and replacements and more money *in* from maintained and increased production . . . don't you think Purchasing and the Front Office will be glad to go along?

BWH
DEPENDABLE RUGGEDNESS

TOUGH PROBLEMS INVITED!
Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting or hose problems. We're specialists in making mechanical rubber products work *better, longer.*

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER CO.

Distributors in all Principal Cities

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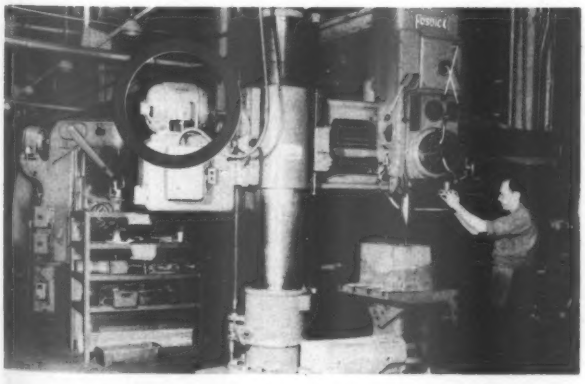
"We have three shifts in operation," says Julius J. Domonkos, Vice-President in Charge of Manufacturing, Bell Aircraft Corporation. "That's full production on a 24-hour day basis. For the past 10 years we've been depending on Tri-Clad motors to carry the load. We've never regretted putting our confidence in this fine motor!"

G-E Tri-Clad Motors drive the machines that are instrumental in producing helicopters, guided missiles, rocket motors, research aircraft, and jet aircraft engine nacelles for our rapidly expanding armed forces. At Bell Aircraft Corporation, G-E Tri-Clads are known as a thoroughly dependable motor —tough on the outside . . . on the inside . . . at the bearings.

BELL AIRCRAFT CORPORATION:

"We've been depending on Tri-Clad* Motors for Ten Years . . ."



This Tri-Clad driven radial drill takes care of most of the large dies for the entire Bell plant. Big dies and bolster plates are drilled and tapped on this machine, a critical part of the Bell operation. Despite continuous use, plant personnel can't remember a single interruption due to Tri-Clad failure!

FASTEST BOMBER IN THE WORLD! Jet engine nacelles for the 600-plus miles-per-hour B-47 are being produced at a record-breaking clip in the Bell plant at Buffalo, N. Y. The "Stratojets" represent a major advance in bombardment aircraft.

*Reg. trademark of General Electric Co.

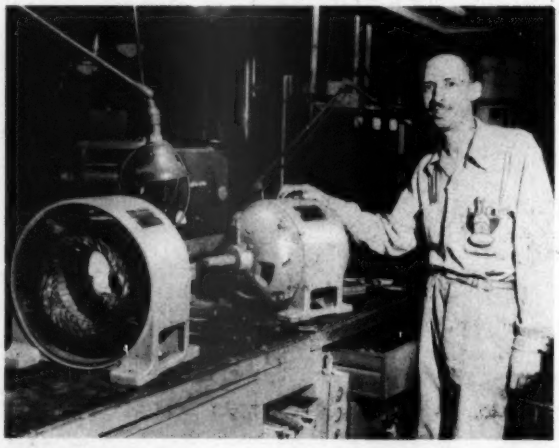
GENERAL ELECTRIC

TRI-CLAD MOTORS

REG. U.S. PAT. OFF.

Help keep Bell Aircraft production up!

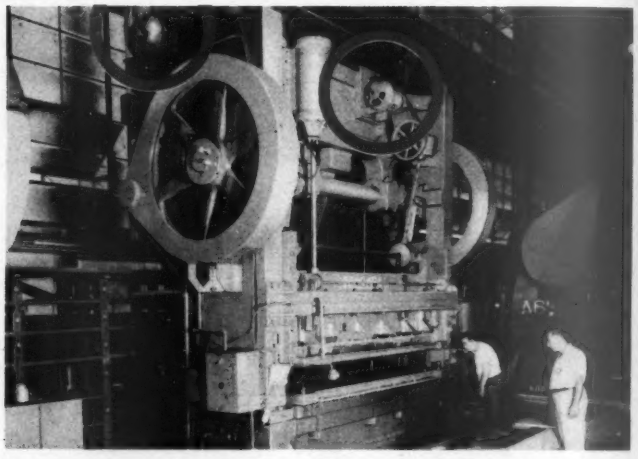
Marvin Limburg (left), Foreman of Bell's Tool and Die Shop, comments, "I don't believe we've ever lost machine time due to breakdown of Tri-Clad motors. And our jig-borers, for example *have been operating around the clock for the last 8 to 10 years!*"



"It's the easiest motor we have to maintain" according to Maxwell Anderson, Crew Chief of Bell's motor repairmen. "There's more working room inside and more room in the slots. It's become a byword with us that if you give a Tri-Clad motor ordinary care you'll never have to worry about maintenance."

TIMELY READING—With every electric motor needed on the line, you'll want a copy of the G-E manual on "How to Maintain Motors and Generators." It's free; just ask for bulletin GET-1202. *Sect. 752-10, General Electric Company, Schenectady 5, N. Y.*

Greasing isn't necessary on a Tri-Clad motor in normal service, but it's always reassuring to know that you *can* lubricate if you so desire, without time-consuming disassembly. The photo shows how easy it is: remove relief plug, attach the grease gun nozzle, squirt—the job is finished.



This huge punch press is an important tool maker. Anton Geiser (right), assistant punch press foreman, says: "I can't recall a single shutdown of this section due to motor failure." Almost all motors in this department are Tri-Clad. This is another Bell Department which has been operating around the clock; cannot afford to lose time because of motor breakdown.

NEW! A Helpful Training Course on Motors!

Everyone concerned with technical training problems will want this new G-E Motor Selection and Application Course. Consists of 9 short, easily understood lessons. Complete kit —slide films, review booklets and instructor's manual— $100.00. Call or write your nearest G-E sales office.

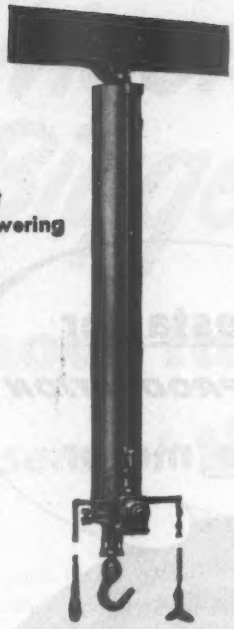
Look at the Scope of this Course

1. Fundamentals of Motors
2. Types of Motors
2. Fundamentals of Selection
4. A-C Induction Motors
5. Single-phase Motors
6. D-C Motors
7. Synchronous Motors
8. Adjustable-speed Drives
9. Gear Motors

GENERAL ELECTRIC

IT'S IMPORTANT

To SAVE MAN HOURS
REDUCE PRODUCTION COSTS
INCREASE EFFICIENCY
That's Why It Will Pay You to Investigate



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AIR COMPRESSORS
AIR-OPERATED CYLINDERS & HOISTS

Tank Mounted Up to 15 H.P. Inclusive— Air Cooled

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Horizontal Air Cylinders for almost any Pushing, Pulling or Hoisting Operation

I-51-1R

Curtis equipment has stood the test of time, because it is precision made from top quality raw materials with 97 years of "know how."

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Stroke? ☐ Capacity? ☐

☐ **AIR COMPRESSORS**
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WESTINGHOUSE
Life-Linestarter
PAIRED FOR PRODUCTION
Life-Line motor
DO NOT LUBRICATE

"Meets Our Biggest Demands...

without failures or down time!"

say users of this matched pair

"Install them and forget them. They're dependable under tough conditions". These words tell the Life-Line motor and Life-Linestarter® story best. See for yourself. Here are a few typical user reports.

A northeastern manufacturer states: "Our Life-Line motors have been running 144 hours per week for 18 months on twisting machines without breakdown or trouble . . . extremely satisfied with performance . . . maintenance time saved by elimination of greasing".

A watchcase manufacturer says, "Our punch-press motors were 14 feet off the floor . . . just high enough so that lubrication was often 'forgotten'. Frequent bearing failures and burnouts resulted until we perched pre-lubricated Life-Lines up there two years ago. Since then . . . no failures of any kind. We're standardized on Life-Lines".

About Life-Linestarters . . . the part of the team that assures positive motor protection . . . one user reports:

"Dirt collecting on contact surfaces was a constant headache, until we installed Life-Linestarters. Their clapper operation, with the contact in a vertical plane, has solved our problem of positive action once and for all".

Another user writes: "Vibration and accidental jolts caused faulty operation . . . made us replace starters frequently. Then, two years ago we tried Life-Line-starters . . . and have not had an accidental fault since".

Typical? Yes. Typical of hundreds of reports in every industry. Why not install these dependable partners on your machines. A check with your Westinghouse representative will bring you full details. Ask for copies of "Life-Line Motor" B-3842 and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-21633

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Life-Line

MOTORS and CONTROLS

UNION CHAIN
is at your service

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ROLLER CHAIN
FLEXIBLE COUPLINGS

UNION
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Suppose You Need a UNION Heavy Duty Chain

... for a drive or conveying application where heavy loads, slower speeds, long life and moderate cost are factors. Union Chain manufactures a complete line of these heavier types of chains, sprockets, flights and aprons, in addition to roller chain and silent chain, and is therefore in a position to make competent, unprejudiced chain recommendations.

Furthermore, an important phase of Union's service to its customers is the designing and building of special chains for unusual applications, particularly for conveying and elevating. Union is in an unusually fortunate position to render such service since we manufacture steel chains of all types and nothing else. This specialization has given us an unusual insight into problems of power transmission and conveying which our customers find valuable to them.

Perhaps we can be of help to you. Your inquiry will be welcomed.

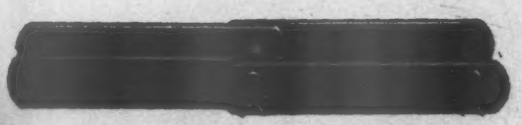
TYPICAL UNION DRIVE AND CONVEYING CHAINS

HB STRAIGHT SIDE BAR ROLLER CHAIN

BRIDGE CHAIN

BP CHAIN

BP ICE CHAIN



HB STRAIGHT SIDE BAR BUSHING CHAIN

COMBINATION MALLEABLE IRON AND STEEL CHAIN

APRON CONVEYOR STYLE A

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The RIGHT abrasive and

Only CARBO

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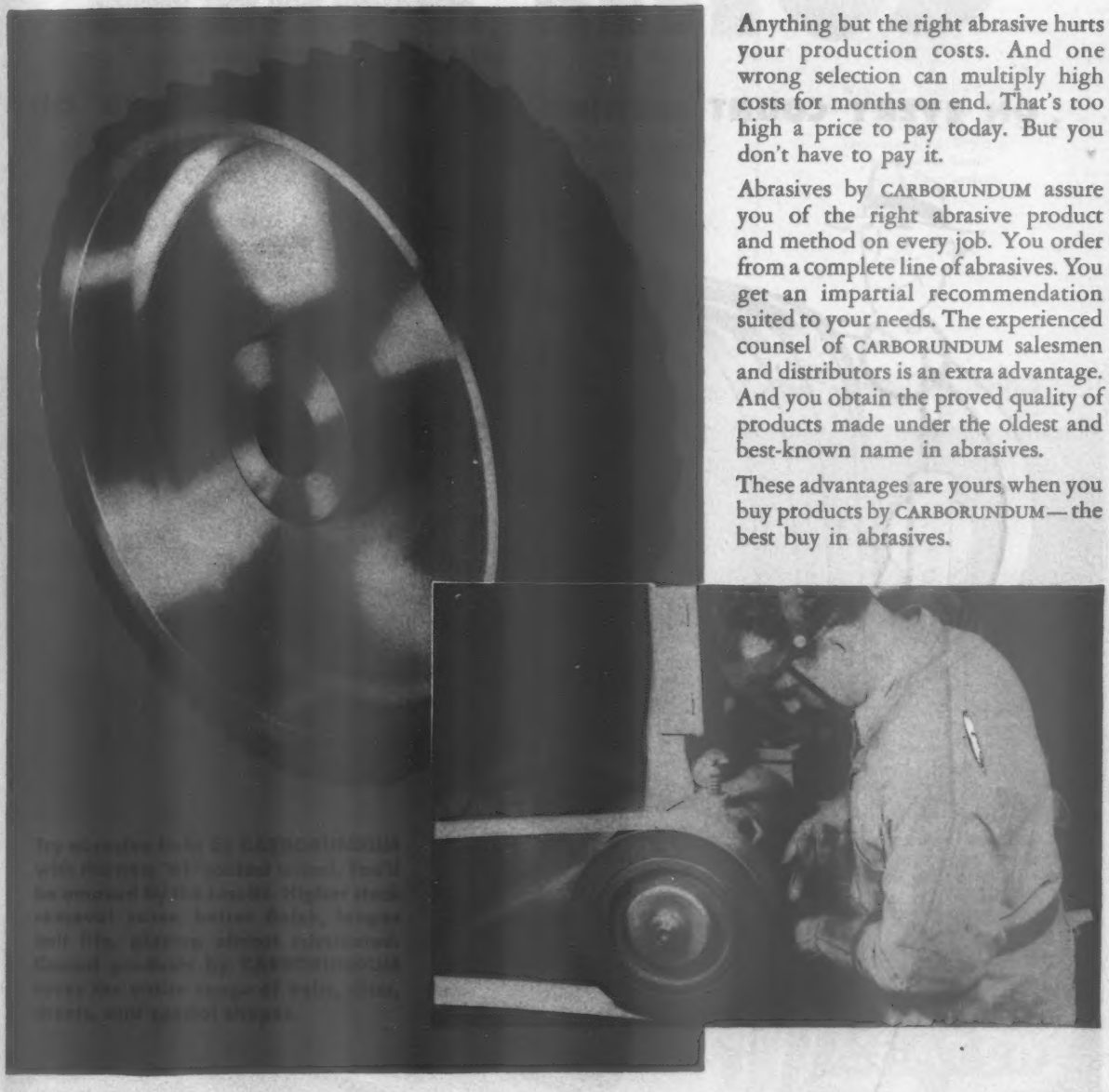
method always cost less



Anything but the right abrasive hurts your production costs. And one wrong selection can multiply high costs for months on end. That's too high a price to pay today. But you don't have to pay it.

Abrasives by CARBORUNDUM assure you of the right abrasive product and method on every job. You order from a complete line of abrasives. You get an impartial recommendation suited to your needs. The experienced counsel of CARBORUNDUM salesmen and distributors is an extra advantage. And you obtain the proved quality of products made under the oldest and best-known name in abrasives.

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makes ALL Abrasive Products...to give you the proper ONE

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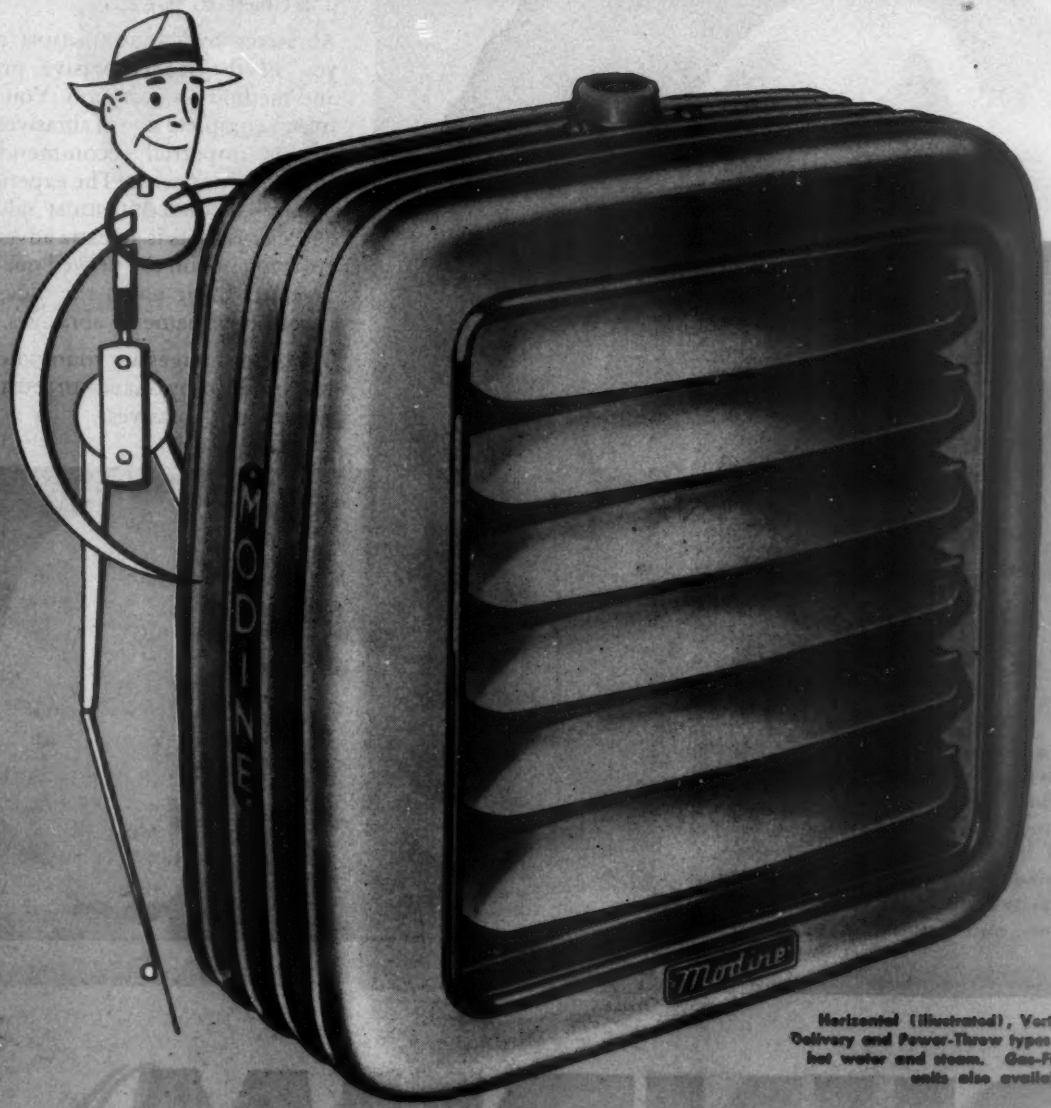
COMPARE

. . ON EVERY COUNT MODINE UNIT HEATERS STAND OUT



Horizontal (Illustrated), Vertical Delivery and Power-Throw types for hot water and steam. Gas-Fired units also available.

Modine UNIT HEATERS

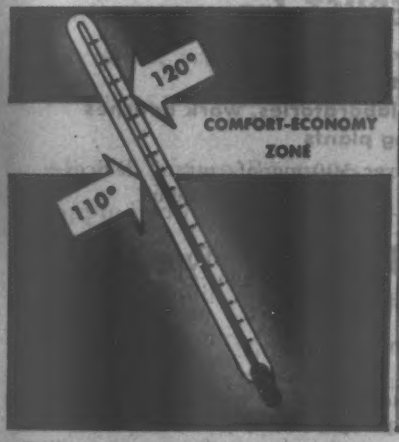
U-1123

Advanced engineering . . . superb styling . . . highest grade materials and craftsmanship—all quality hallmarks of Modine Unit Heaters. They're your assurance of *heating performance at its best* — high fuel economy . . . years of trouble-free service. Built to a standard of excellence — Modine is the choice for unfailing dependability, lower operating and maintenance costs. So whether you need Horizontal Delivery models (illustrated), Verticals or Power-Throws — *compare first!* Modine Mfg. Co., 1505 DeKoven Ave., Racine, Wis.

ENGINEERS RATE MODINE THE STANDARD OF EXCELLENCE

Write for Bulletin 149-A, "Modine Unit Heating." Or contact your Modine representative listed in your phone book classified section.

Six of many outstanding features that account for the Modine quality reputation



Discharge air temperatures of 110° to 120° F. are correctly related to air velocities — assure perfect heating comfort plus lower fuel costs.

Sturdy, steel, integral fan guard offers safety from exposed fan — serves as a resilient, vibration-absorbing mounting for the unit's motor.

Built-in velocity generator effectively steps up heat throw. This assures positive heat penetration of the cold air strata that is near the floor.

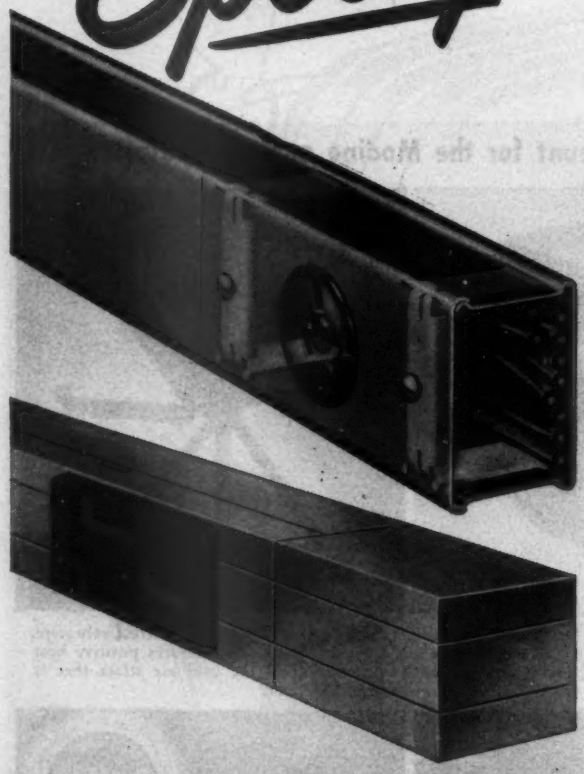
Direct-from-pipe suspension is safe and economical, with no hanger-rods. Heated air stream may be easily redirected over full 360° range.

Sound-silencing features assure quieter operation — certified by accurate laboratory sound ratings. Especially important for commercial and institutional use.

Parker-Bonderizing provides rust-resistance for casings and other sheetmetal parts — anchors paint to steel — preserves the fine finish longer.

National Electric

Surface Raceways for *Speedy* INDUSTRIAL WIRING,



Use SURFACEDUCT for—

- **Feeder and distribution systems**
- **Lighting installations**
- **Assembly lines, laboratories, work benches**
- **Rewiring existing plants**

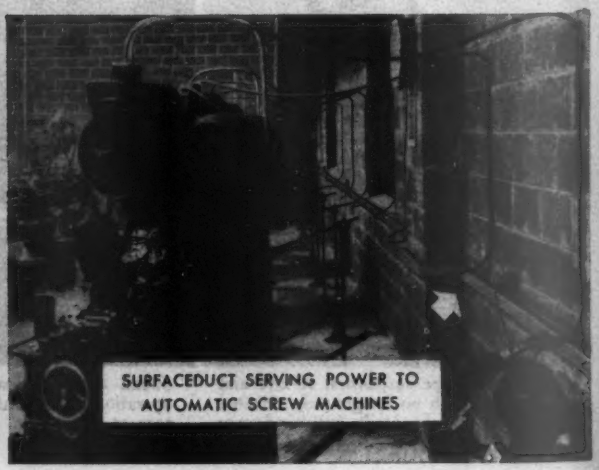
Accommodates over 300 manufacturers' devices—22 simple fittings for all job requirements.

Use "PLUG-IN" STRIP (Type CF2-G with Grounding Facility) for—

- **Portable equipment**
- **Hand tools**
- **Assembly benches, electrical testing departments, etc.**
- **General office equipment**

A s-p-r-e-a-d of outlets every 6″ or 18″ for convenience *plus* safe grounding built-in. Permits use of either grounded or ungrounded devices from same outlet.

SURFACEDUCT FOR TESTING EQUIPMENT



SURFACEDUCT SERVING POWER TO AUTOMATIC SCREW MACHINES

EXTENSIONS and RELOCATIONS

National Electric raceways *go up fast*—just the thing for quick, easy industrial rewiring jobs, electrical additions and relocations.

All NE Surface Raceways are two-piece base and capping with the famous "Lay-in" principle designed to save time—*and money*. No fishing required. Attach the base, lay-in the wires, snap on the capping and the job is done! ("Plug-In" Strip comes pre-wired from the factory, ready to use.)

There's an NE Surface Raceway for every type and size of electrical distribution up to 60 amperes. A minimum of fittings, yet meets requirements for all types of installations.

Listed by Underwriters' Laboratories, Inc.

Sold through electrical wholesalers everywhere.

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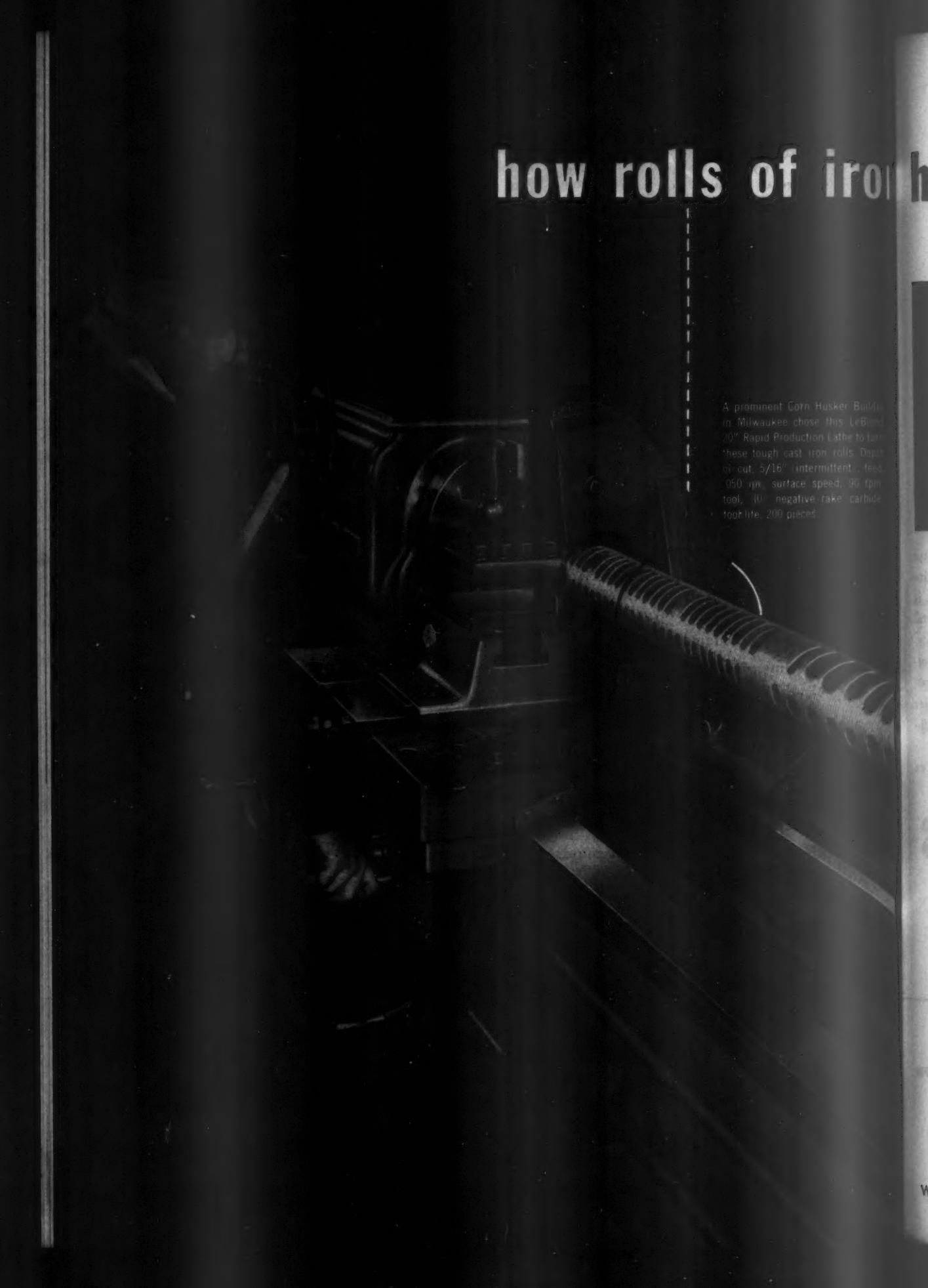
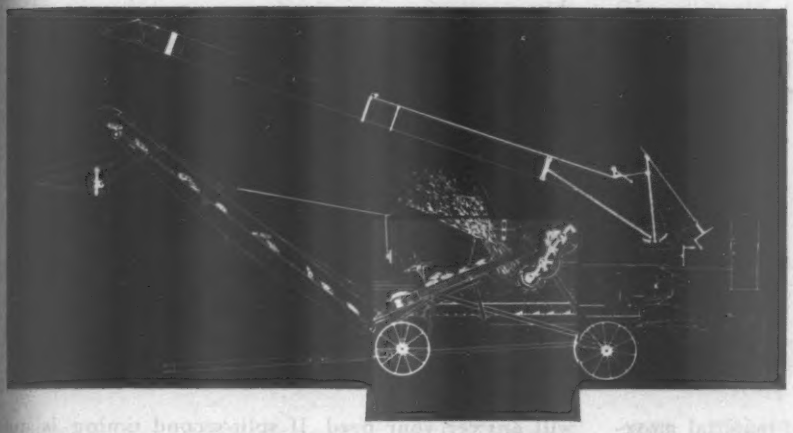
1347 CHAMBER OF COMMERCE BLDG., PITTSBURGH 19, PA.

how rolls of iron h



A prominent Corn Husker Builder in Milwaukee chose this LeBlond 20" Rapid Production Lathe to turn these tough cast iron rolls. Depth of cut, 5/16" (intermittent), feed .050 ipr, surface speed, 90 fpm, tool, 10° negative rake carbide tool-bit life, 200 pieces.

help put meat on your table



At the heart of machines that husk corn and shred the stalks into fodder are iron rolls like these! They help the farmer convert his crop to feed for livestock—the steers and hogs that become tender steaks and juicy hams for your table.

A prominent Milwaukee builder of husker-shredder machines for more than sixty years, needed a production lathe to turn these rolls . . . a lathe rugged enough to take the beating of a 5/16″ intermittent cut at .050″ feed and 90 surface feet per minute, and to withstand the forces of a 30° negative-rake carbide tool, cutting iron hardened by casting around a steel shaft!

On the recommendation of LeBlond's Chicago Office, they put a LeBlond 20″ Rapid Production Lathe on the job. Result? *Three and a half years of rough yet trouble-free production . . . and many more to go!*

A LeBlond 20″ Rapid Production will give you high production turning of a *variety* of work within the range you choose. It offers two speed ranges, 45 to 300 rpm or 67 to 450 rpm, and 18 feeds from .005″ to .150″.

Not a converted engine lathe, it has no quick-change box or leadscrew, expensive features unnecessary for production work.

Whether you're turning rugged rolls or precision shafts, there's a LeBlond Lathe to turn them faster, better. Your LeBlond Distributor will tell you about the 20″ Rapid Production and other late models. Call him or write—

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for Bulletin RP-220 H. for more information on the 20″ Rapid Production Lathe.

turned faster by

LeBLOND *of Cincinnati*

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 63 YEARS*

Style E Attachment

Style A Attachment

How's your "moving" picture?

Style D Attachment

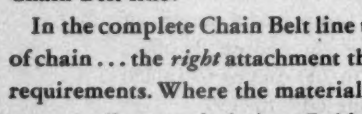
If you're concerned with problems of material movement, have you considered the flexibility—economy—efficiency of chains and attachments?

And, if you have, do you realize the possibilities for increased efficiency and cost reduction in the complete Chain Belt line?

In the complete Chain Belt line there is a size and type of chain . . . the *right* attachment that will exactly fit your requirements. Where the material being moved requires exact, split-second timing, Baldwin-Rex Roller Chain and one of its many standard or special attachments will answer your need. If split-second timing is not required and low cost is important, perhaps Baldwin-Rex Double Pitch Roller Chain or a Rex Cast Chain is the answer. If corrosion is a problem, a Rex Z-Metal Cast Chain will do the job.

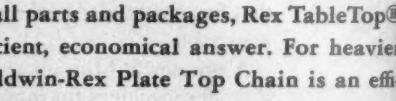
If your problem involves the handling of cans, bottles, jars, or small parts and packages, Rex TableTop® provides an efficient, economical answer. For heavier duty service, Baldwin-Rex Plate Top Chain is an efficient, low cost mover.

For extremely heavy load, heavy-duty service, Rex



Style A Attachment

Style H Attachment



Style D Attachment

Chain Belt COMPANY

of MILWAUKEE

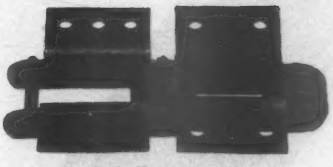
REX CHAIN & TRANSMISSION DIVISION
Milwaukee 4, Wisconsin

BALDWIN-DUCKWORTH DIVISION
Springfield 2, Massachusetts

Style F Attachment

Style F Attachment

Style G Attachment



Style K Attachment

Chabelco Steel Chains offer a wide range of sizes and types with attachments that provide years of efficient carrying service.

Because the Chain Belt line is complete . . . our Field Sales Engineers can recommend the exact chain that is exactly right for your requirements. You'll find their highly specialized knowledge valuable to you in getting lower costs—improved performance from your equipment.

Call or write your nearest Chain Belt Field Sales Office or mail the coupon for your copy of Bulletin 50-35.

★ *The chain attachments illustrated are just a few of the many standard designs found in the complete Chain Belt line.*

REX

® BALDWIN-REX

CHAIN BELT DISTRICT SALES OFFICES

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51-105B

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Milwaukee 4, Wisconsin

Gentlemen:
Please send me bulletin 50-35.

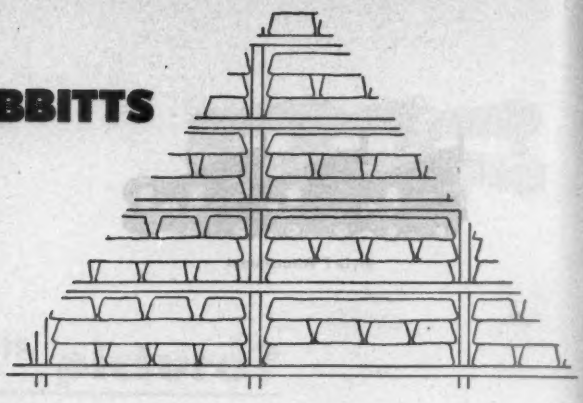
Name.....

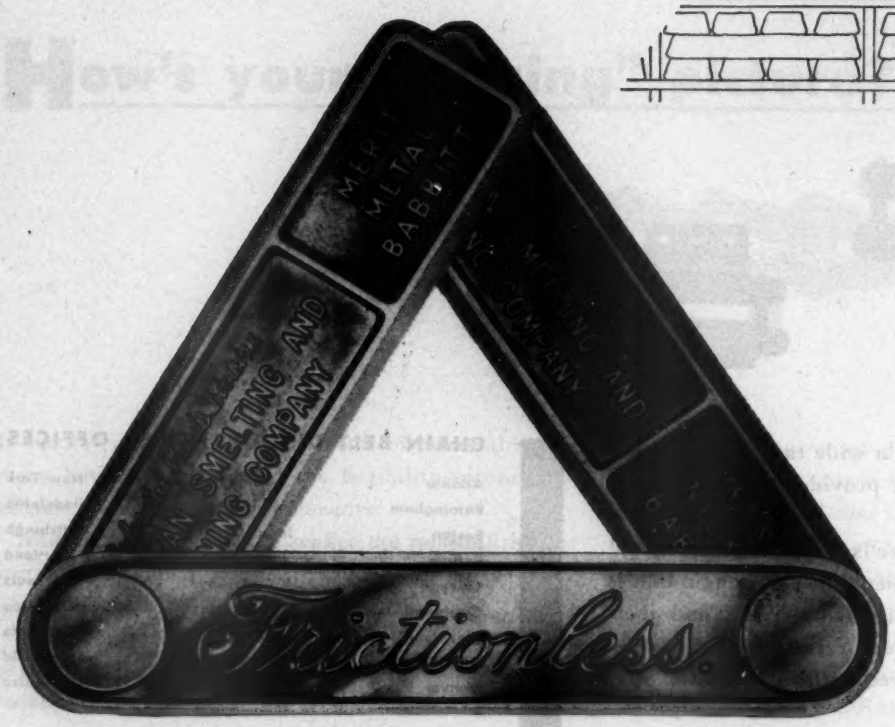
Company.....*Dept*.....

Address.....

City.....*State*.....

FEDERATED'S "BIG 3" BABBITTS





for 90% of all maintenance bearing work

Federated's "Big 3" now includes the famous Frictionless® Bearing Metal. With XXXX Nickel® for heaviest loads and extreme speeds, and Merit Metal, "the Universal Babbitt," for moderate loads and moderate speeds, Frictionless is the low-cost item for a wide variety of services in which it has proved its reliability for many years.

Frictionless will continue to be manufactured to exactly the same formula which has made it one of the country's most popular babbitts.

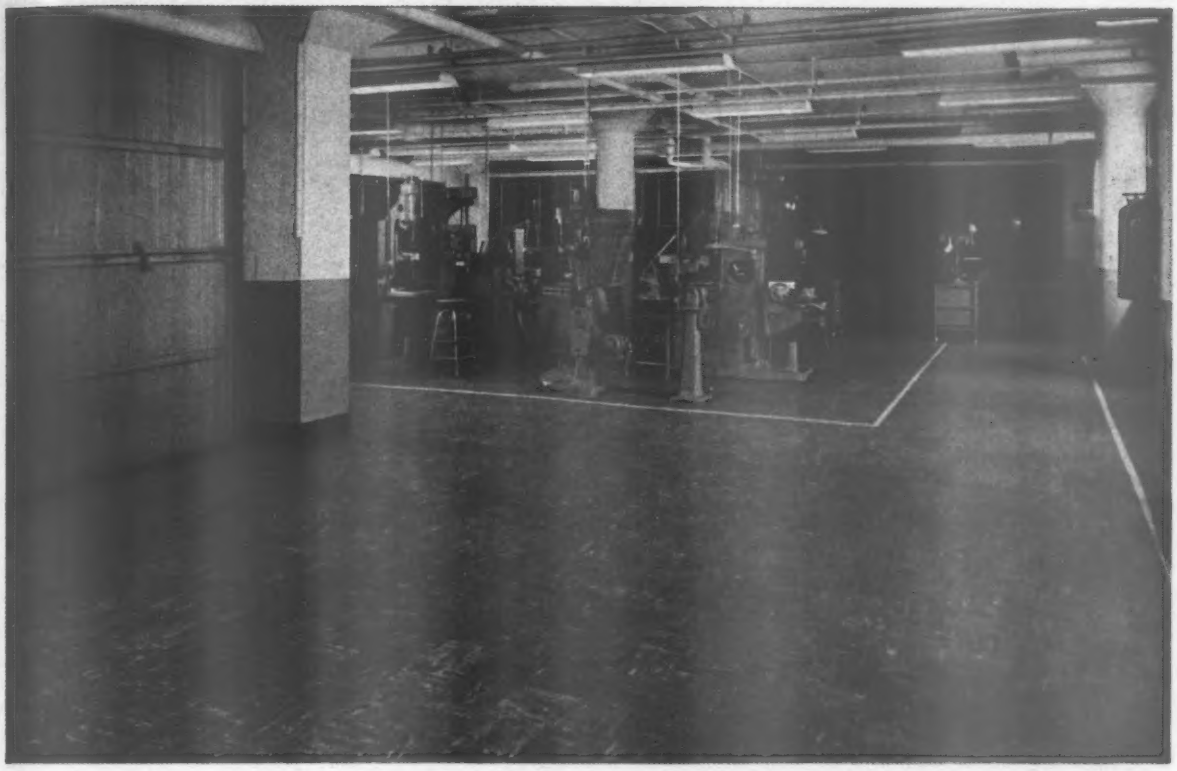
With Federated's "Big 3" bearing metals in your stockroom you can pour the right bearing to fill practically any machinery or equipment maintenance requirement.

For special applications Federated will continue to produce bearing alloys to customers' specifications.

For most customers' maintenance requirements Federated recommends the "Big 3". It's a combination which will hold down stockroom items . . . minimize the risk of shortages . . . simplify inventory control and purchasing.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY • 120 BROADWAY, NEW YORK 5, N. Y.



GET *Beauty in Working Clothes* ...

GET *Tuff-Tex* GREASEPROOF INDUSTRIAL TILE

Quick, easy, fast... that's the installation story on Tuff-Tex, the attractive, unit-laid industrial floor. And, it more than lives up to its name. It is tough!

Every plant operator wants economy. Well, he gets it when he puts in a Tuff-Tex* floor . . . *three-way* economy.

Installation is quick. You don't tie-up space for long.

Put in *unit-laid* Tuff-Tex, and traffic travels over it in a few hours. Economical installation, plus moderate material prices mean *first cost is low.*

Maintenance is simple. Daily sweeping to remove loose dirt, periodic washing, water-waxing (if desired) . . . that's all. Repairs are quick and inexpensive because they can be limited to damaged tiles. That lowers *operating cost.*

Tuff-Tex is highly grease-resistant (you can use it even in machining areas) and *so* tough it withstands constant traffic of heavy materials handling trucks with ease. That means *service life is exceptionally long.*

There's your *three-way economy* . . . low first cost, low operating cost, long service life. And, you get many other advantages in utility and appearance.

A Tuff-Tex floor is attractive. You have unusual versatility in design . . . either decorative or functional.

You can inlay your own trademark in the floor . . . or use the unit-laid feature of Tuff-Tex to outline traffic aisles, shipping areas, material bays, and the like.

Get this three-way economy... plus Tuff-Tex's other advantages... whether you're building a new plant or remodeling an existing building.

Your local Tile-Tex contractor will give you product data, samples and complete information on our design counsel and floor layout services... for the asking.

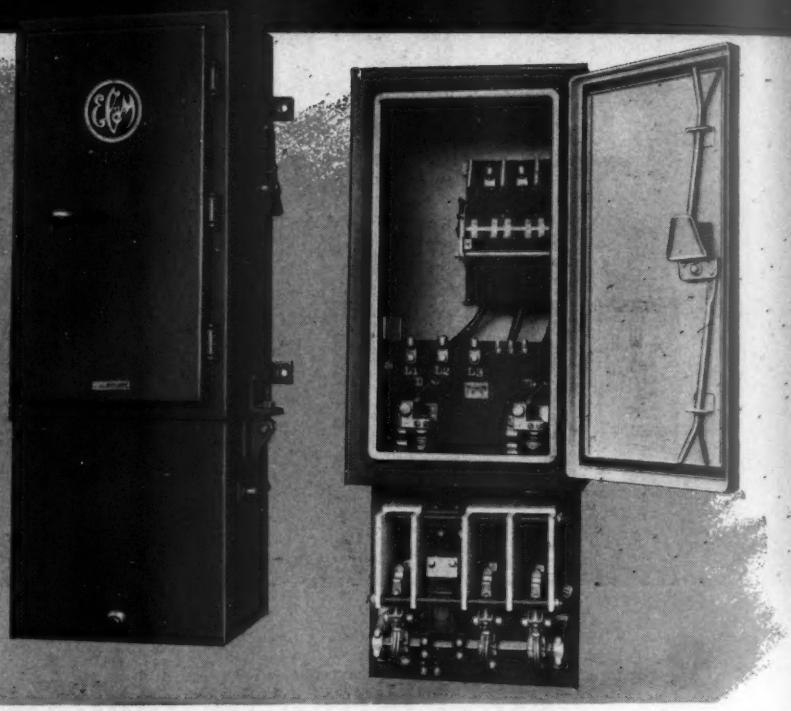
If he's not in the telephone book, write THE TILE-TEX DIVISION, The Flintkote Company, Dept. F, 1234 McKinley St., Chicago Heights, Ill.

Tile-Tex
GREASEPROOF INDUSTRIAL
FLOORS AND WALLS

*Registered Trademark, The Flintkote Company

When POWER Transformers are LARGE---

these 220-550 volt EC&M Starters *Safeguard* Motor Investment



10,000-AMPERE INTERRUPTING CAPACITY

Weather-resistant enclosure ★ Drop oil tank ★ Instantaneous and inverse time-element trip on magnetic overload relays ★ Combination starter with self-contained disconnect

Many plants have processing operations for refining or reducing materials which require electric power supplied by transformers of large KVA rating. The fault capabilities of such a system can produce disastrous results to a standard low-voltage starter should a motor circuit be faulted.

For these low-voltage systems, the selection of motor starters is as important as those for higher voltages. Unless equipped with auxiliary protective devices, a standard starter with limited thermal and interrupting capacity is inadequate to protect the motor and starter circuit.

Especially developed for these applications are these EC&M Type LZ, Form HR, Leaflet 1069, Motor Starters which do not use auxiliary protective devices. Their thermal and interrupting rating is many times greater than that of a starter of standard construction. The 10,000-ampere interrupting capacity rating of these EC&M Starters has been proved by test.

When transformers are large, safeguard the investment of motor, starter and wiring with these EC&M, Leaflet 1069, Motor Starters. Contact your nearby EC&M Sales Office for complete information.

Write for Leaflet 1069

THE ELECTRIC CONTROLLER & MFG. CO.

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Tape it with Behr-cat

THIS EXTRA STRONG, filament reinforced, pressure-sensitive strapping tape is specifically designed to improve industrial packaging. Its light weight makes it especially suitable for air freight. And shipping departments save time and costs with quick application and easy handling. BEHR-CAT strapping tape is a big improvement over the old steel band method of packaging and eliminates the danger of wire snapping, handling-cuts, etc. It holds wooden or metal objects securely without scratching or damaging edges. Use BEHR-CAT strapping tape for sealing cartons, wrapping wire coils, tubes, plate glass and banding metal parts. Order a supply from your distributor or write direct.

YOUR SPECIAL TAPE PROBLEM is welcomed at BEHR-MANNING. Our fully staffed laboratories are completely at your service. Put us to the test. Write us today. Address Dept. F-10.

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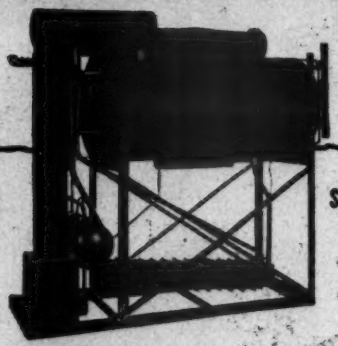
NEW SERVEL EQUIPMENT S
AIR-CONDITIONING OR C

SERVEL ABSORPTION EQUIPMENT



WATER CHILLER: Rated capacity under standard ASRE conditions—25 tons. Hermetically sealed absorption refrigeration system. Refrigerant, water. Absorbent, lithium bromide. Source of energy, steam. Refrigeration unit operates under a vacuum.

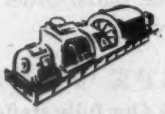
OPERATES ON ANY OF THESE SOURCES OF STEAM

GAS-OPERATED STEAM GENERATOR

INDUSTRIAL BOILER

WASTE-HEAT BOILER

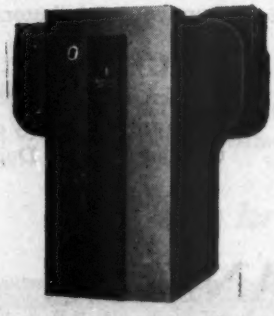
CONDENSATE STEAM GENERATOR



TURBINE EXHAUST STEAM

DISTRICT STEAM LINES

Self-Contained Unit: 5 tons of cooling, heating optional.



All-Year Air Conditioners. In 3-ton and 5-ton sizes. Cooling and heating. For single or multiple installation.

SUPPLIES CHILLED WATER OR AIR CONDITIONING FOR

INDUSTRIAL PROCESSING

FACTORIES

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SIMPLIFIES ALMOST ANY COOLING APPLICATION

- Light enough to install anywhere
- Runs on steam from any source, any pressure
- Electric-power needs are nominal
- Modulates down to 50% of capacity

NO MATTER how large or how small your cooling or air-conditioning job, the chances are that one of Servel's absorption units can do it better, easier, and at less cost.

If it's chilled water for industrial processing, or air conditioning large buildings that you're interested in, take a look at the new Servel 25-Ton Water Chiller. This latest addition to the Servel line runs on steam from any source, at any pressure. If waste steam or waste heat is available, you can operate on it and save most of the normal costs of fuel.

Electric-power needs are nominal, so you can usually connect to existing wiring. The unit is light, quiet, vibration-free—so much so that you can install it on any floor, without expensive bracing. It supplies chilled water in industrial processes, and—by the use of heat exchangers—will supply air conditioning in any building by simple piping.

For smaller areas, the Servel Self-Contained 5-Ton Air Conditioner, and the 3-ton and 5-ton units provide flexible, low-cost air conditioning. All Servel units have the famous Servel no-moving-parts cooling system. Thus you get long life, low maintenance, quiet, dependable operation.

Get complete information today. And if you'll enclose details of your process cooling or air-conditioning problems, we'll be glad to tell you which unit, or combination of units, our application engineers recommend. Servel, Inc., Evansville 20, Ind.

WHY SERVEL IS YOUR BEST AIR-CONDITIONING BUY

- No Moving Parts in Cooling System To Wear Out
- Low Maintenance Costs
- Hermetically Sealed Circuits
- Long Life
- Completely Safe Operation
- Chilled Water Circuit Operates Under Normal Pump Pressure
- 5-Year Factory Warranty

SEND COUPON FOR MORE INFORMATION

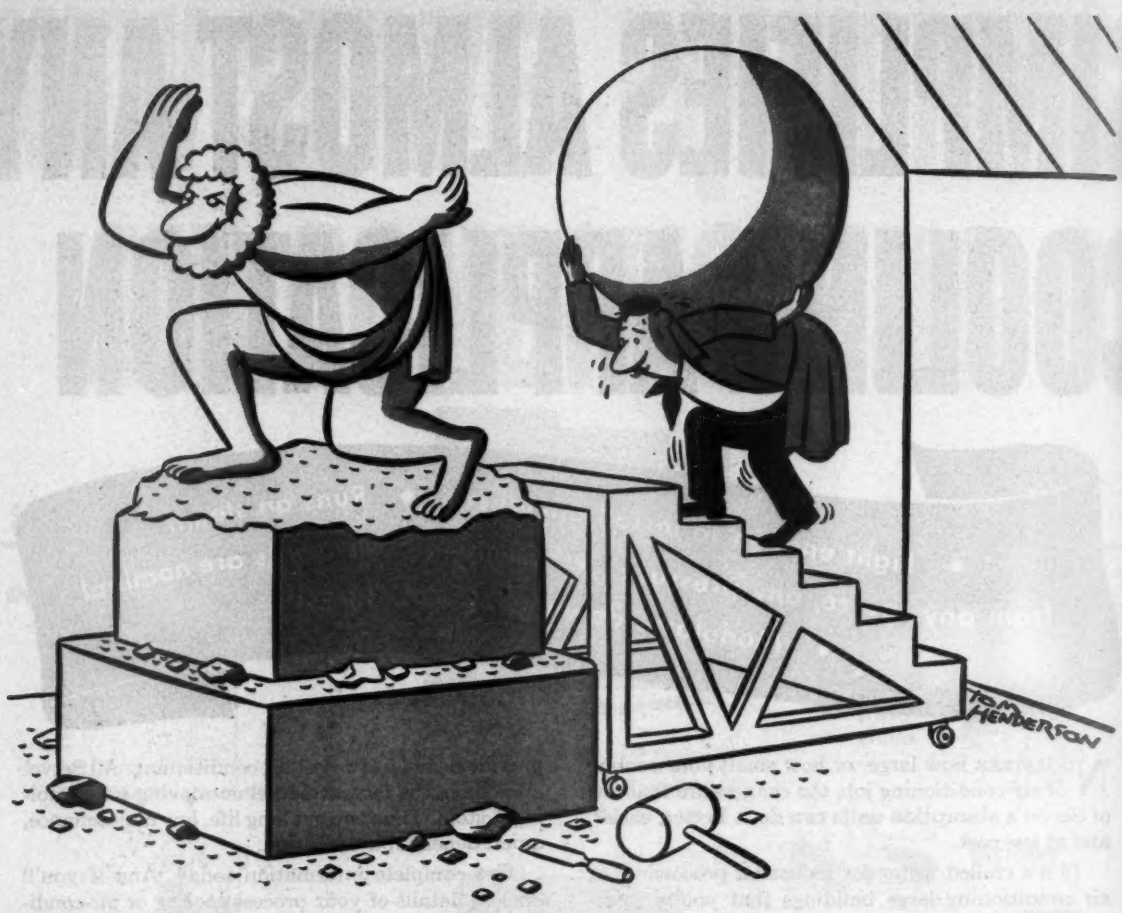
Servel

AIR CONDITIONERS

FOR INDUSTRY • FOR HOME • FOR BUSINESS

Servel, Inc.
Department V-210, Evansville 20, Indiana
Gentlemen:
Please send me more information on the following:
Servel 25-Ton Water Chiller_____
Servel Self-Contained Air Conditioner_____
Servel 3- and 5-Ton *All-Year* Air Conditioners_____
*Name*_____
*Firm*_____
*Address*_____

IF YOUR JOB CAN BE DONE BETTER WITH AIR CONDITIONING OR COOLING, IT CAN BE DONE BEST WITH SERVEL



There's a YALE hoist for *every* lifting job!

• Sculptor, steel man or stevedore—when you've got a load on your mind, the name to know is YALE!

You're sure to get your lifting done faster... more safely ...at less cost with a YALE hoist, because YALE can give you the hoist that's *exactly right for your kind of lifting.*

Electric hoists (wire rope and chain types)... trolley and hook suspensions hoists... hand hoists... YALE makes 'em all!

Illustrated is a YALE Spur-Geared Hand Chain Hoist—"from hook to hook a line of steel." It's safe, speedy, powerful, the most widely used hand hoist in industry! Capacities range from 500 pounds to 40 tons.

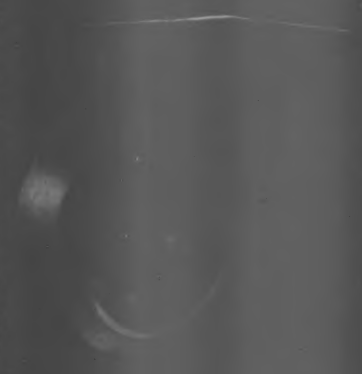
Check with your YALE distributor for information about the hoist that will lift more and save more for you. Or for FREE detailed literature, write Dept. 310, The Yale & Towne Manufacturing Co., Phila. 15, Pa.

YALE & TOWNE

Yale is a registered trademark of The Yale & Towne Manufacturing Company

Model 3-427-45
For medium weight industrial equipment—capacity 300 lb. per caster

Model 5-807-15
Especially designed for heavy-duty industrial work—capacity 800 lb. per caster



Model 6-807-66
For extra heavy service. Made of heavy duty steel—practically indestructible

Load-Floating Colson Casters

Make Old Equipment Roll Like New

For the price of new roll-easy COLSON casters and wheels you can change old bumpy, hard-to-push equipment to an efficient fast-rolling fleet. COLSON casters from 75 to 1500 pound capacity save you money by saving time and protecting your floors. Other cost-cutting materials-handling equipment by COLSON includes hand trucks, barrel and drum trucks, platform trucks and Lift-Jack Systems. Write us or consult the yellow pages of your phone book (under "Casters" or "Trucks: Industrial") for the COLSON office near you.

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Please send free copy of 68 page catalog "Colson Casters".

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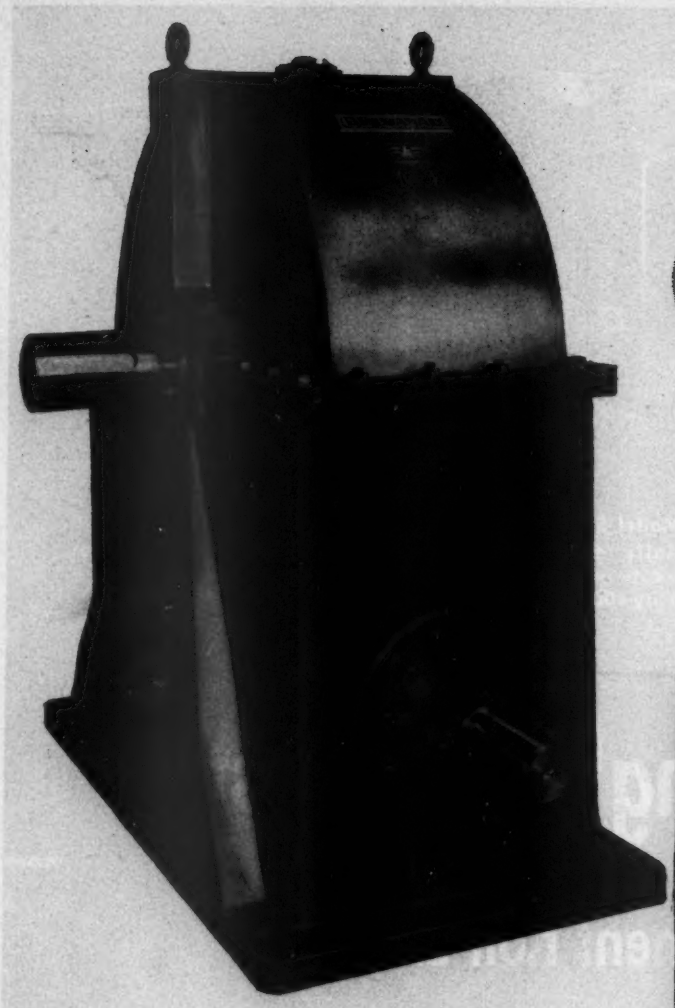
We build'em all sizes at De Laval



Giant

Take a look at this 30" center distance worm gear speed reducer! As far as we know, it is the *largest* standard enclosed drive unit ever built. It's doing a big job, too, on a large Mesta Machine Co. slabbing mill for a prominent steel company. A twin of this giant is scheduled for a new eastern mill.

FREE

Easy-Selection Manual

Is there a quick way to select the right reducer for your application? Yes, new De Laval Manual G-WBV makes it simple as ABC. It contains complete selection data, hp rating tables and outline drawings . . . all set up in easy-to-use form. Write for your copy today.

Dwarf

Here's one of the smaller De Laval worm gear speed reducers with a 3" center distance. It is being used by the Crichton Company, Johnstown, Pa. for their new coal drilling machine. Big, small or in-between, De Laval heavy duty worm gear reducers are proving profitable investments for scores of machinery manufacturers throughout the country.

50th Anniversary

DE LAVAL *Speed Reducers* *Built to be Built-into a Quality Product*

DE LAVAL STEAM TURBINE COMPANY • TRENTON 2, NEW JERSEY

DL-109

How to ruin a $1,000 floor...

(for only a dollar)

The cleaner you use may be all right for rubber—but all wrong for linoleum. It may work wonders with wood—but may not be effective on tile.

Yes, you can lose thousands of dollars with only a dollar's worth of the wrong cleaner!

No cleanser can meet every need. Holcomb shows you, with actual tests, which cleanser works best for your floor condition.

There's no guesswork, no wasted time, no unnecessary expense. Your Holcomb Serviceman comes into your plant, tests your floors, instructs your workmen.

He demonstrates how you save—in cleaning time, in cleaning costs—before the job is begun.

Regardless of your cleaning problem, standardize with Holcomb—your one source, your dependable source, for scientific cleaning materials.

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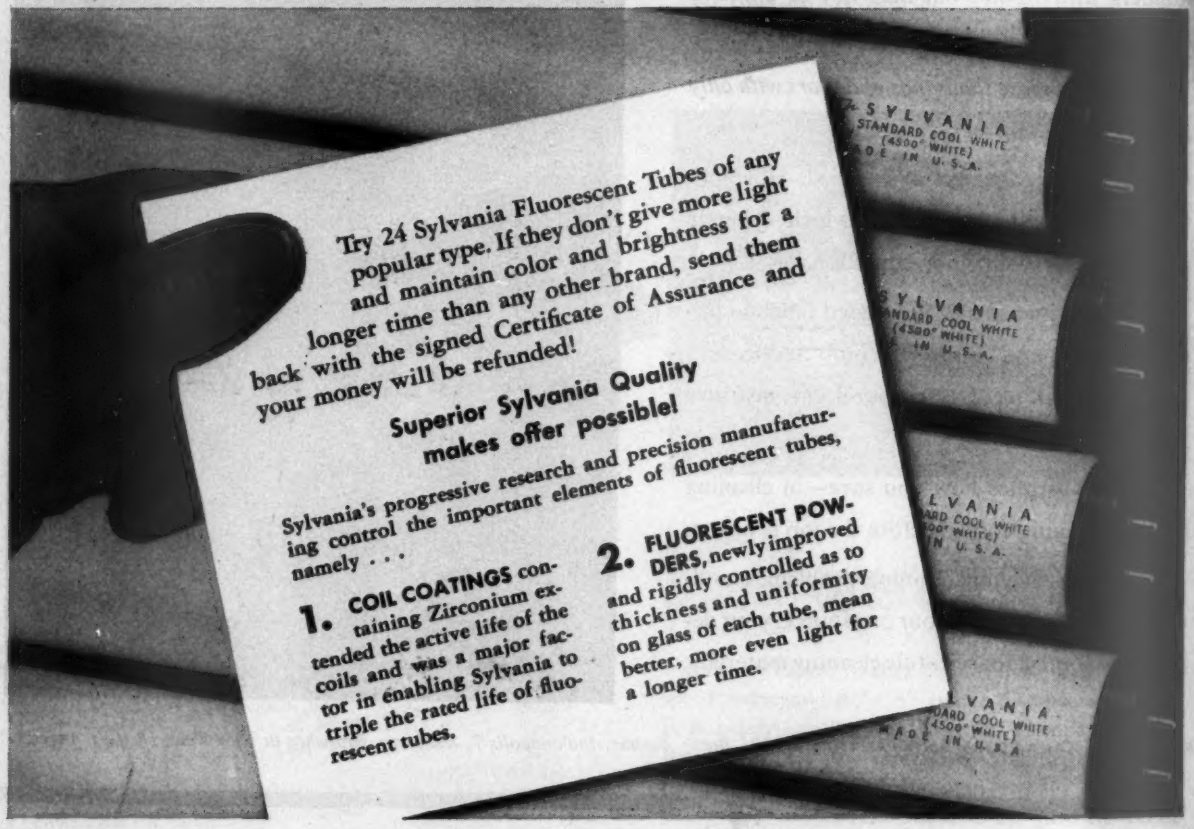
Call a Cleaning Engineer—your nearby Holcomb Serviceman. He will come into your plant, make a complete cleaning survey, give you the best recommendations for walls, floors, ceilings and machinery. Write for name of the Holcomb Serviceman in your community.

J. I. HOLCOMB MANUFACTURING COMPANY

Scientific cleaning materials

NO RISK!

If you do not agree that Sylvania Fluorescent Tubes are the finest you have ever used...return them for full cash refund!


Try 24 Sylvania Fluorescent Tubes of any popular type. If they don't give more light and maintain color and brightness for a longer time than any other brand, send them back with the signed Certificate of Assurance and your money will be refunded!
Superior Sylvania Quality makes offer possible!
Sylvania's progressive research and precision manufacturing control the important elements of fluorescent tubes, namely . . .
1. COIL COATINGS containing Zirconium extended the active life of the coils and was a major factor in enabling Sylvania to triple the rated life of fluorescent tubes.
2. FLUORESCENT POWDERS, newly improved and rigidly controlled as to thickness and uniformity on glass of each tube, mean better, more even light for a longer time.
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STANDARD COOL WHITE
(4500° WHITE)
MADE IN U.S.A.

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QUALIFIED LIGHTING CONTRACTOR AUTHORIZED SYLVANIA SALES SERVICE

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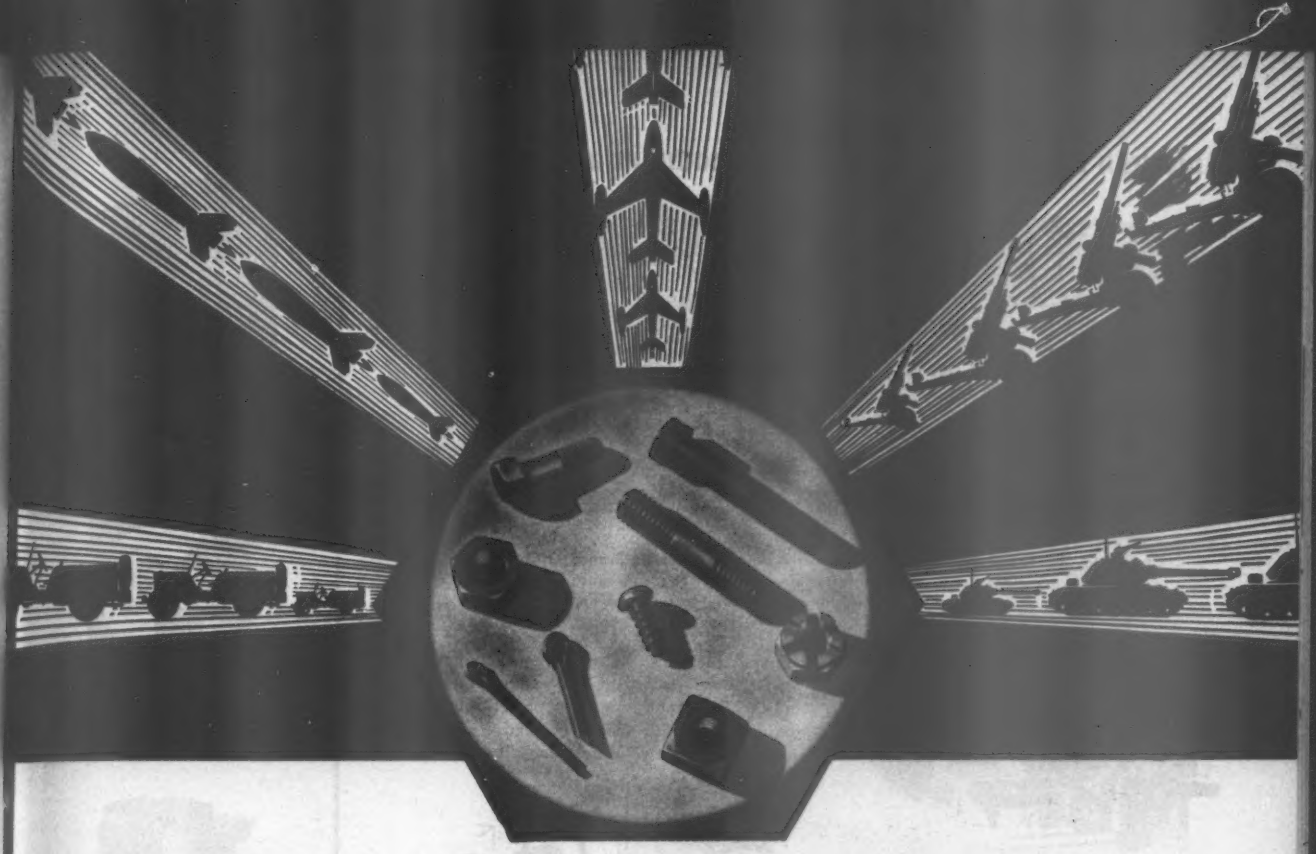
Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

FLUORESCENT TUBES, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC PRODUCTS; ELECTRONIC TEST EQUIPMENT; PHOTOLAMPS; TELEVISION SETS



Fasteners

. . . for our "First Lines" of Defense !

Granted—our Armed Forces have always been our First Lines of Defense. This is a proud distinction nobody can usurp.

But even before the men of our Army, Navy and Air Forces can go into action, the Production Lines of the country must supply the "tools" for the job.

Lamson & Sessions manufactures fasteners which play a vital part in keeping these "first lines" rolling. For practically every finished product requires bolts, nuts, screws, cotters, etc. In fact, over 2% OF THE STEEL PRODUCED IS USED TO FASTEN THE REST TOGETHER.

You who run the production "first lines of defense" are welcome to consult Lamson anytime on fastener problems.

The home of "quality controlled" fasteners

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The LAMSON & SESSIONS Co. • • General Offices: 1971 West 85th Street • Cleveland 2, Ohio

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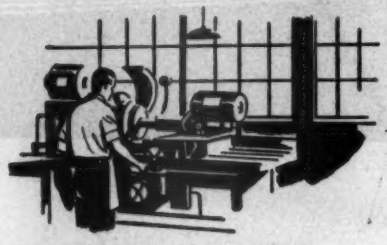
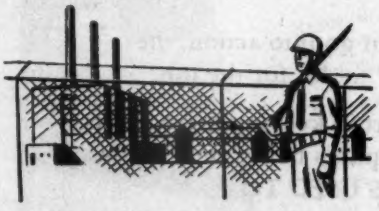
Charlotte, N. C., has a conveniently located American Blower Branch Office to provide you with data and equipment for air handling. You can reach American Blower in Charlotte by calling 3-8444. In other cities, consult your phone book.



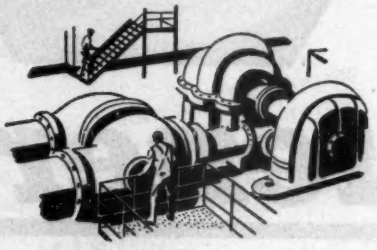
FOR MILLING, GRINDING...

Dust from grinding machine operations created a problem in the plant of a major steel file manufacturer. Then, several American Blower Type E Industrial Fans were installed. Now, the plant is cleaner, safer, and working conditions more pleasant. Type E Fans are specially designed to remove shavings, sawdust, dust from grinding and buffing, to convey material, remove smoke and fumes, and for many other applications. Can American Blower products help you?



MORE EFFICIENT POWER...

American Blower Induced Draft Fans play an essential part in the operation of a new military air station power plant. High static efficiency, low RPM, low tip speed and low inlet velocity are important operating characteristics of these dependable fans. In military or civilian installations, American Blower equipment meets the most exacting power plant requirements. If you are enlarging or expanding your facilities, consult us.

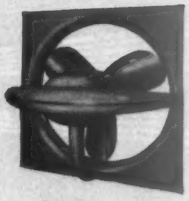


BETTER PUMPING...

A large midwestern city recently invested in an American Blower Gyrol Fluid Drive for one of its municipal water supply pumps. After two months the average power requirements dropped from 932 kilowatt hours per million gallons of water to 718 kilowatt hours—a reduction of 23%. After the first year the increased power savings and added flexibility of control justified the addition of a second fluid drive on a larger unit. Could *you* save with Gyrol Fluid Drives?

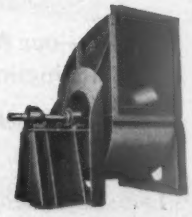
If you're faced with changing from civilian to military production, let American Blower supply you with the air handling products that improve comfort and efficiency in business. For full data on American Blower heating, cooling, drying, air conditioning and air handling equipment, phone or write our nearest branch office.

Unit Heaters



Ventura Fans

Air Conditioning Equipment



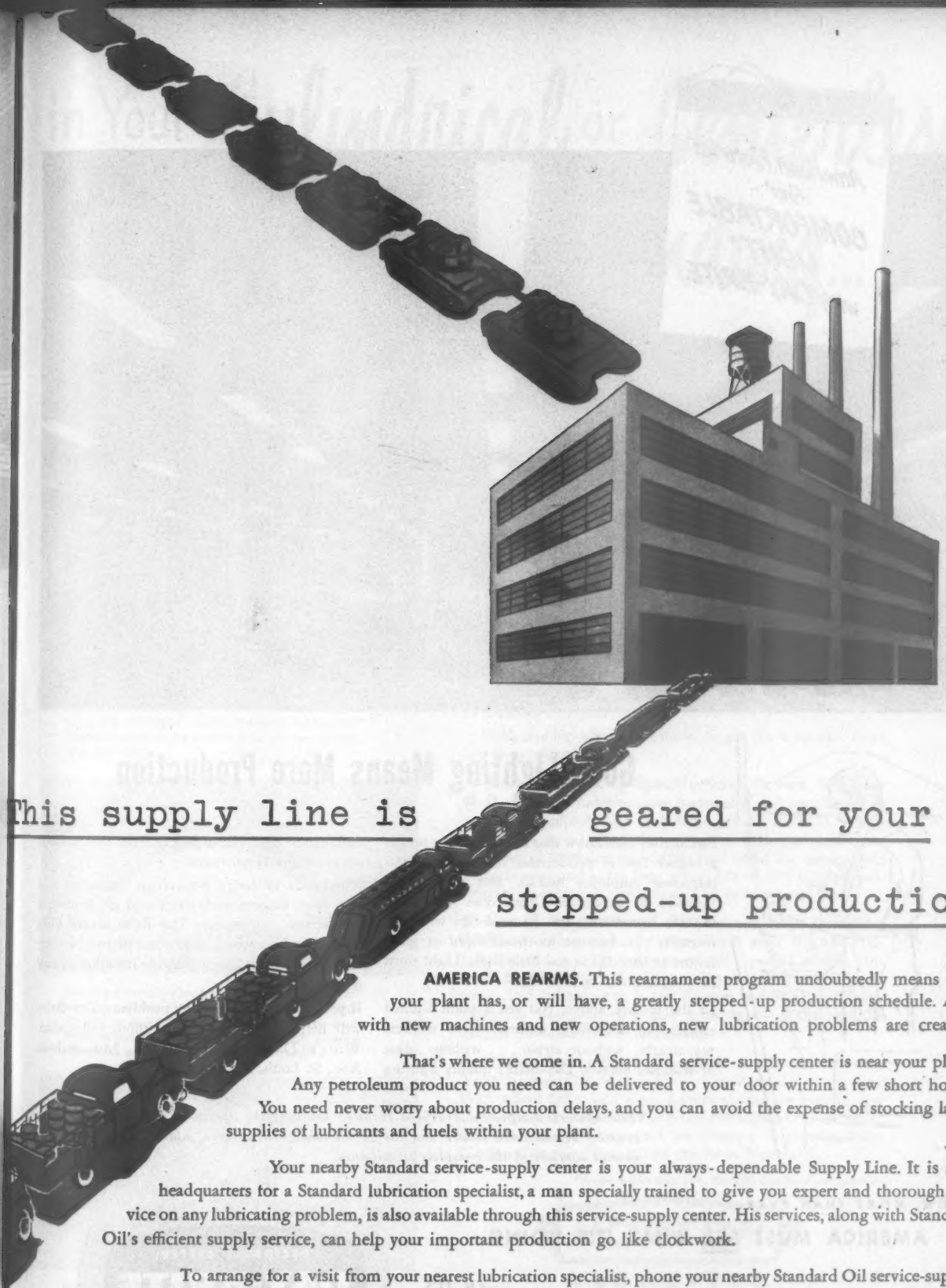
Industrial Fans

Utility Sets

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

YOUR BEST BUY AMERICAN BLOWER AIR HANDLING EQUIPMENT

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON



This supply line is geared for your stepped-up production

AMERICA REARMS. This rearmament program undoubtedly means that your plant has, or will have, a greatly stepped-up production schedule. And with new machines and new operations, new lubrication problems are created.

That's where we come in. A Standard service-supply center is near your plant. Any petroleum product you need can be delivered to your door within a few short hours. You need never worry about production delays, and you can avoid the expense of stocking large supplies of lubricants and fuels within your plant.

Your nearby Standard service-supply center is your always-dependable Supply Line. It is also headquarters for a Standard lubrication specialist, a man specially trained to give you expert and thorough advice on any lubricating problem, is also available through this service-supply center. His services, along with Standard Oil's efficient supply service, can help your important production go like clockwork.

To arrange for a visit from your nearest lubrication specialist, phone your nearby Standard Oil service-supply center or write to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

Good Lighting Means More Production

Production men know that adequate light means a higher rate of production, less spoilage and improved employee morale. But solving the problem of insufficient light does not mean merely increasing the footcandles of light intensity . . . because too much light or glare is just as harmful as too little light. Light must be adequate *and* comfortable.

In the picture above, you see a plant lighted entirely by Day-Brite fixtures. Here workers see clearly, without strain . . . without glare or shadows because Day-Brite's quality lighting fixtures are designed to insure light that is both *adequate and comfortable.*

Hundreds of large American factories use Day-Brite fixtures exclusively and get complete satisfaction . . . because Day-Brite makes only quality fixtures which give years of trouble-free service . . . at the lowest possible installation and maintenance costs.

If *you* have factory lighting problems, Day-Brite will help you solve them, without obligation. Write to Day-Brite Lighting, Inc., 5441 Bulwer Ave., St. Louis, Mo.

**The upward component provided through the reflector apertures minimizes contrast between the fixture and the surrounding ceiling area, adding to the overall comfort of the complete installation.*

NOW, MORE THAN EVER

AMERICA MUST SEE WHAT IT'S DOING

IT'S EASY TO SEE WHEN IT'S

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

158

In Your Cylindrical or Centerless Grinding...

Grinding a large cylindrical part to exact tolerance and degree of finish. The Norton range of specifications enables you to select exactly the right wheel for work like this.

A plunge-cut grinding job to a shoulder on a centerless machine. Units being ground are textile machinery parts, for which wheels of Norton ALUNDUM* (fused alumina) in the correct grain size and grade, give best results.

Shaping a wheel by crush truing, with hardened steel crushing roll shown in raised position. Both Norton ALUNDUM and CRYSTOLON* wheels can be crush trued, to give excellent results in this rapidly growing method of grinding intricate O. D. contours.

HANDY ILLUSTRATED BOOKLET gives you the essential facts on cylindrical and centerless grinding and provides convenient selection charts. Ask your Norton Distributor for Form 2006. Or write direct for free copy. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

It's easier to

GET MORE UNITS

per dressing • per hour per wheel

WITH NORTON O. D. GRINDING WHEELS

You want your cylindrical or centerless grinding wheels to deliver exactly the required tolerances and finish . . . in piece after piece . . . hour after hour . . . with a minimum of dressing or replacement.

With Norton wheels it's *easier* to get these results. Here are the reasons:

1. Norton Range of Specifications Covers All Your O. D. Jobs. Whatever your material or job specifications — in the complete line of Norton wheels for O.D. grinding you're sure to find the *one* wheel with the *right* combination of abrasive grain type and bond for top cutting performance and extra long wheel life — and Norton uniformity assures top performance in *every* wheel.

2. Norton Applicational Aid Covers Your Grinding Problems. In practically every case your Norton Distributor can quickly tell you which types of wheels you need. Backing him is the Norton Abrasive Engineer in your area. And behind both is the Norton technical staff, representing the resources and know-how of the world's largest manufacturer of abrasives.

3. Norton Stocks Cover Your Delivery Requirements. Your Norton Distributor keeps ample stocks of popular O.D. wheel types and sizes. Larger stocks are maintained in Norton warehouses in key cities throughout the country, and you can always count on prompt shipments from Norton Company's complete stocks in Worcester.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

Making better products to make other products better

DEPENDABLE

under severest conditions of dust and dirt!

DODGE-TIMKEN

- Even under layers of grime, dirt and abrasive dust encountered in many production operations, the Dodge-Timken Type C bearing carries its power load smoothly, efficiently, without interruption—because it's
- Triple-sealed to prevent the entry of dust, however fine. Accurately machined steel seals keep dirt *out* and lubricant *in*.
- Dodge mounts, seals, houses Timken precision bearing units in rugged assemblies (four different types) to deliver a minimum of 30,000 hours uninterrupted service.
- Dodge Timken Type C Pillow Blocks are fully self-aligning, with both radial and thrust carrying capacity.
- Delivered fully assembled, adjusted and lubricated, ready to lock on shaft. Locking collars at both ends insure firm fastening.
- Normally available from Dodge Distributors' stocks, sizes from 1-7/16" to 4-15/16".

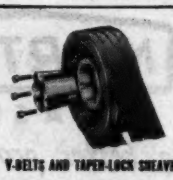
DODGE MANUFACTURING CORPORATION, 400 Union Street, Mishawaka, Indiana

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor for assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!



V-BELTS AND TAPER-LOCK SHEAVES

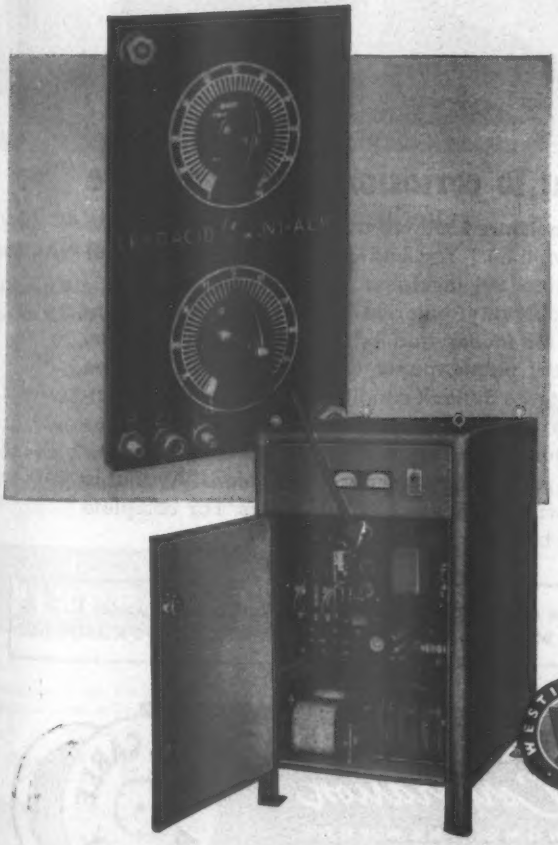
TORQUE-ARM SPEED REDUCERS

ROLLING GRIP AND DIAMOND D CLUTCHES

SOLID STEEL CONVEYOR PULLEYS

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO, ILLINOIS

"Rectox SIMPLE DIAL OPERATION is for me!"



Just set the dials for the starting and finish rate. No transformer or reactor taps to change for current adjustment. It is completely automatic . . . foolproof. Anyone can operate it. Just plug it in and forget it. What's more:

- ★ One unit serves 80% of your battery charging requirements.
- ★ No energy wasting resistor . . : no moving parts.
- ★ Combination units charge lead-acid or nickel-alkaline-type batteries.

MORE DATA? Ask your Westinghouse Representative for a copy of DB-19-040 or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-21619

Westinghouse

Rectox

INDUSTRIAL TRUCK CHARGERS

Where corrosion is severe . . . wire your plant with

Rome Synthinol® 901

THERMOPLASTIC INSULATED WIRES AND CABLES

Underwriters' Approved for 600 Volts

Exceptionally resistant to corrosion, heat, moisture

Corrosive fumes, heat and moisture soon eat away ordinary insulations . . . resulting in costly "down-time." You can avoid this expensive lost production with Rome Synthinol 901 insulation.

Rome Synthinol 901 is a polyvinyl chloride type of thermoplastic insulation specifically made for feeder and branch circuit, as well as, equipment wiring in chemical plants, paper and steel mills, refineries . . . in fact, any installation where difficult conditions exist. Its high resistance to heat, moisture, acids, alkalies, corrosive fumes, oils and greases means longer life and greater safety factor.

Rome Synthinol 901 gives permanency to your wiring plans. Available in standard range of sizes with permanently clear colors. For complete information mail the coupon below.

Copper wire mill products are a Controlled Material under N. P. A. Controlled Materials Plan. USE CMP ALLOTMENTS PROMPTLY.

ROME CABLE CORPORATION, Dept. F-10, Rome, N. Y.
Please send me your Rome Synthinol Bulletin.

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

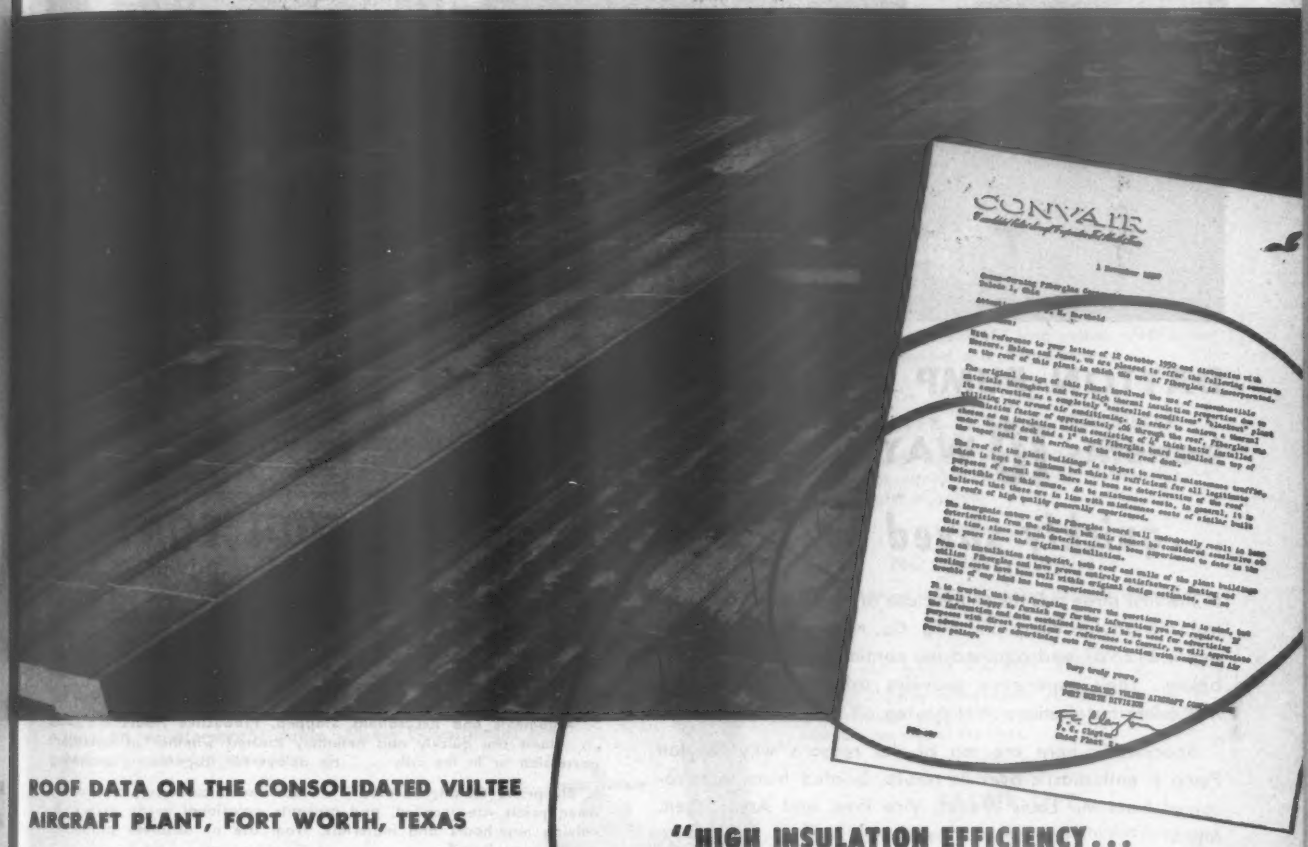
ROME CABLE
Corporation
ROME · NEW YORK
From Bar to Finished Wire

ROME CABLE ROME, N.Y.

PROVED IN USE

Famous B-36 Bomber Plant Reports On

FIBERGLAS* ROOF INSULATION



ROOF DATA ON THE CONSOLIDATED VULTEE AIRCRAFT PLANT, FORT WORTH, TEXAS

Designers & Builders: The Austin Company.....Cleveland

Roofing Contractors:

Hamilton Roofing Co.....Fort Worth
Building Materials Co.....Fort Worth
Lydick Roofing Co.....Fort Worth
Macatee, Inc.....Dallas

Roof Deck: Steel

Roof Insulation: 1,294,000 sq. ft. of Fiberglas Roof Insulation

Roofing: 4-ply pitch and gravel.....20-year Bond

OWENS-CORNING FIBERGLAS ROOF INSULATION

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of the Owens-Corning Fiberglas Corporation for a variety of products made of or with fibers of glass.

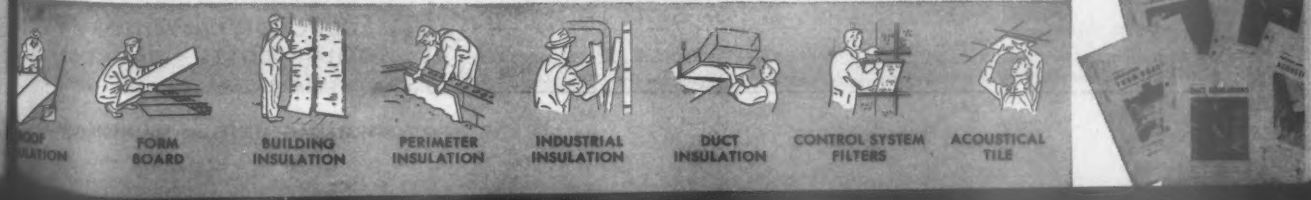
"HIGH INSULATION EFFICIENCY... NO DETERIORATION!"

Read what Mr. F. C. Clayton, Chief Plant Engineer, says in his letter of November 1st:

- Heating and cooling costs are well within original design estimates.
- No deterioration detectable from exposure to elements because of the inorganic nature of the board.
- No deterioration detectable after being subjected to normal roof maintenance traffic.
- Fiberglas Roof Insulation has proved entirely satisfactory during the nine years since the original installation.

With rapid installation and conservation of fuel again gaining in importance, you can specify Fiberglas Roof Insulation with confidence. For complete information write for "The Design of Insulated Roofs" (a 36-page manual) or refer to Sweet's Files—Architectural. Owens-Corning Fiberglas Corporation, Dept. 85-J, Toledo 1, Ohio. Branch offices in principal cities.

WRITE FOR FIBERGLAS DESIGN DATA



Two Index and Location Boards, below, list Dayton Pump's general purpose tools; two others list and identify special tools, jigs and fixtures; Planning Boards beside them provide visible record of all tools drawn by each employee. Cabinet at the left contains complete records of all tools whether in crib or issued to operators. The entire unit produces the improvements and savings outlined below.

DAYTON PUMP benefits 10 WAYS

...quickly saved $12,957 with McCASKEY TOOL CONTROL

In the first three months of their use of McCaskey Tool Control, the Dayton Pump and Mfg. Co. reduced their tool expense $12,957 and attained the continuing results outlined below. Their experience provides additional proof that McCaskey installations start paying off immediately.

Specifically here are ten of the reasons why Dayton Pump is enthusiastic over its results, briefed from facts received from Mr. Louis Wozar, Vice Pres. and Assoc. Gen. Mgr.:

1. **Idle Tools Recovered** . . . up-to-the-minute inventory of all special and standard tools, taken during McCaskey installation, revealed amazing quantity held in tool boxes and benches for occasional jobs . . . now available for daily requirements.

2. **Tool Inventory Reduced 20%** . . . by requiring operators to return tools not in use . . . by determining (1) proper inventory levels and (2) quantities to be purchased through reference to accurate tool usage and inventory records instead of guesswork.

3. **Less Tool Breakage** . . . McCaskey breakage report has made operators "tool conscious" and careful . . . indicates whether employee, method or operating conditions are responsible.

4. **Crib Performance More Efficient** . . . McCaskey Index and Location Boards, key to fast service to production, instantly provide tool number, description, size and location of all tools . . . for special tools, jigs and fixtures also show whether used on active or service parts . . . accurate, compact, easily read . . . also facilitate storage of more tools in less space.

5. **Arguments and Accusations Stopped, Productive Hours Increased** . . . tools are quickly and definitely located whether in operator's possession or in the crib . . . no delays for disputes or searching.

6. **Blueprints Quickly Located** . . . eliminates confusion and delay, when prints are recalled, and prevents occasional costly errors, involving man-hours and materials, from use of obsolete prints not turned in or found.

7. **Accurate Tool Usage Records** . . . now available for quick check-up on performance data and obsolescence.

8. **Perpetual Inventory** . . . accurate, up-to-the-minute record of available tools easily maintained by positive procedure.

9. **More Productive Time for Machines, Tools and Men** . . . thru faster service to job setters and production workers . . . no lost motions in tool crib . . . no dependence on attendants' memory . . . no laborious clerical work.

10. **Efficient Operation with Inexperienced Attendants** . . . new personnel quickly and easily trained to operate McCaskey Tool Control smoothly and efficiently.

These advantages produced big savings in the first months of operation. They point to continued savings month after month for Dayton Pump . . . and for you, too. Why not investigate NOW? Mail the coupon for step-by-step procedure and additional facts today.

THE McCASKEY REGISTER CO., ALLIANCE, OHIO

Send me complete information about McCaskey Tool Crib Control . . . procedure . . . user's reports . . . all the facts.

Name .....

Position .....

Company .....

Address .....

FMM 1051

McCaskey
INDUSTRIAL CONTROLS
PRODUCTION • INVENTORY • TOOLS • COSTS • PAYROLL

SPACEMASTER®

ELECTRIC FORK TRUCK

FOR HEAVY DUTY HIGH SPEED OPERATION

new "61"

unprecedented

The Truck With *Plus* Features

3000 POUND RATING –

PLUS 61 INCH OUTSIDE TURNING RADIUS provide ideal heavy duty, high speed, warehouse fork truck.

MOST STABLE, MOST MANEUVERABLE, AND SAFEST 3000 lb. capacity fork truck for handling up to 48" long loads. Can also be used for transporting up to 4000 lbs. in load lengths up to 32".

***Plus* these extra "Standrive" Advantages.**

STANDRIVING IN REVERSE IS AS EASY AS FORWARD. Trailing the load gives *full vision* with convenient operation.

EASY ON, EASY OFF! Clear through corridor allows quick exit and entrance *either side*. Saves hours of operator's time on supplemental duties. Meets Government and industry safety regulations.

CAPACITIES
3000 Lbs.
up to 48" load length

LIFT 127"
(collapsed height 83")

TURNING RADIUS
61"

MINIMUM AISLES

Will right angle stack 40" long pallets in 10' aisles with recommended operating clearance.

Plus

GREATER LATERAL STABILITY

NEW welded frame and NEW counter-weighted construction provide ideal weight distribution — lowest center of gravity.

Plus

NO GREASE POINTS

Absolutely no points requiring periodic lubrication.

Plus

LESS DOWN TIME

Highest Quality components. All adjustments, inspection and normal maintenance can be made from the top side of the truck.

Plus

FASTER LIFT

New, high-efficient lifting motor and hydraulic pump.

Plus

GREATER SAFETY

Center control, stand-up operation acknowledged the ultimate for safety.

Send for Bulletin "61"

MULTIPLY MANPOWER · LEWIS-SHEPARD

LEWIS-SHEPARD

engineered to meet defense production needs

for higher lighting levels at lower maintenance and operation costs

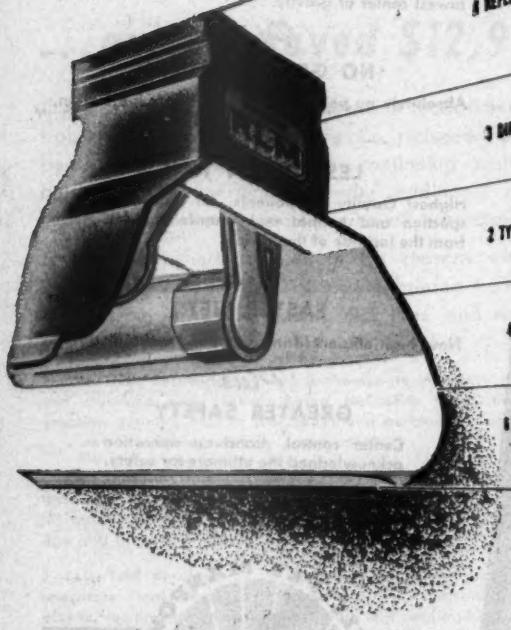
One of today's most important defense production lighting problems is not only *how to get* HIGH LIGHTING LEVELS economically, but also, *how to sustain them* economically, year after year. Benjamin's answer is "MAGNA-FLO". This new lighting system, by utilizing the new, high light-output efficiency T12 Slimline Lamps, provides higher light output more efficiently, more ECONOMICALLY, than any other Benjamin-built fluorescent unit.

Furthermore, with "Magna-Flo" you are assured that this high light-output efficiency of the T12 lamp is SUSTAINED ECONOMICALLY, year after year. Porcelain Enameled reflecting surfaces sustain this efficiency by maintaining original high reflectivity with occasional soap-and-water cleaning. "Springlox" Lampholders sustain efficiency by facilitating maintenance of the reflector and the lamps themselves. Benjamin "Battleship" construction, utilizing extra-heavy gauge reflector steel, sustains efficiency by preventing sag, distortion and breakage.

FREE "MAGNA-FLO" BULLETIN brings you complete data about this most modern, efficient way to get HIGHER LIGHTING LEVELS at lower cost . . . write for your free copy TODAY! BENJAMIN ELECTRIC MFG. CO., Dept. N, Des Plaines, Ill.

BENJAMIN "Magna-Flo"

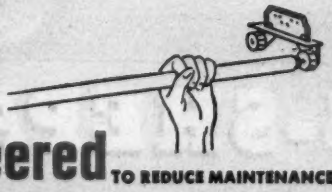
Sold Exclusively Through Electrical Distributors

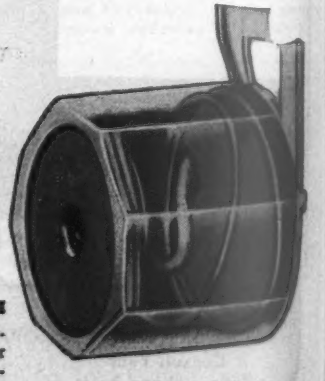


4 REFLECTOR STYLES	OPEN-END	CLOSED-END	OPEN-END WITH APERTURES	CLOSED-END WITH APERTURES		
3 DIFFERENT SIZES	48"	72"	96"			
2 TYPES OF UNITS	INDIVIDUAL	CONTINUOUS LINES				
4 IMPORTANT ACCESSORIES	LOUVERS	PLASTIC COVERS	GLASS COVERS	LONGITUDINAL SHIELDS		
6 TYPES OF SUSPENSIONS (SLIDING OR STATIONARY)	CHAIN	½" CONDUIT	SINGLE-ROD	CEILING	CABLE	TWIN-ROD

engineered TO CAPITALIZE TO THE FULLEST

ON THE NEW, HIGHER-EFFICIENCY, INSTANT-START T12 SLIMLINE LAMPS! "Magna-Flo" Units are available in a wide range of systems for nearly all industrial seeing requirements! Open or closed-end diffuser-type reflectors are available. Apertures in these reflectors direct 5% of light upward for greater seeing comfort.





engineered TO REDUCE MAINTENANCE

AND OPERATING COSTS! *Exclusive "SPRINGLOX" Lampholders,* by simplifying re-lamping, facilitate reflector cleaning and maintenance. They make possible fast, one-hand lamp insertion, and assurance against lamps working loose or dropping out.

B55628

Fastens steel or wood to concrete or steel in seconds!

NEW CARTRIDGE-POWERED **MODEL 450**

REMINGTON STUD DRIVER

Sets fastening studs up to 100 times faster than conventional methods...needs no outside power source

You can speed construction and maintenance fastening jobs and cut costs with the amazing new Remington Stud Driver. This simple tool attaches steel or wood pieces and fittings to concrete or steel . . . easily sets as high as 5 fastening studs in a minute. No outside power source or other equipment needed. It's compact, rugged, *safe*. Test-proved to be the world's finest fastening system, the Model 450 Remington Stud Driver is made by Remington Arms Company, Inc., America's oldest and foremost sporting arms manufacturer. For detailed information and the name of your nearest distributor, fill out and mail the coupon below. There may be slight initial delays on delivery until production and distribution catch up with demand.

LOOK AT THESE EXCEPTIONAL FEATURES

COMPACT AND PORTABLE — Weighs only 5½ pounds, ideal for scaffold, ladder, overhead work, inaccessible places. Comfortable to use in any position.

SPEED—One man can set up to 5 studs per minute, as much as 100 times faster than other methods. Sets stud at whatever depth is required up to 2¾ inches, depending on material.

ELIMINATES INVESTMENT IN OUTSIDE POWER —Self-powered. Especially useful in isolated places.

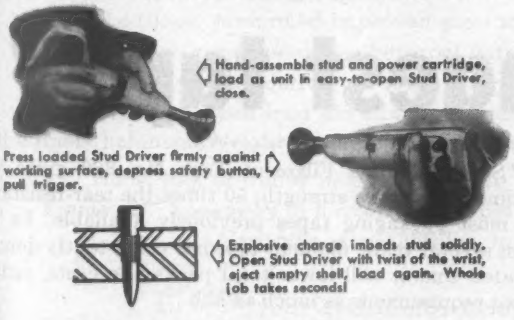
TRIPLE SAFE—Plainly visible red dot indicator shows when it's cocked; safety must be depressed before and during squeezing of main trigger; permanently attached safety shield must be compressed against work before Stud Driver will operate. Trigger can't be accidentally tripped. Slight recoil. Low noise level.

WIDE VARIETY OF STUDS are available for every fastening job. Genuine Remington studs are trademarked for user's protection. Pull-out resistance as high as two tons in good concrete, depending on stud used. Cartridges are available in 5 power loads covering practically all fastening needs.

UNIQUE, FAST ASSEMBLY OF STUD AND CARTRIDGE—Tough plastic heel cap permits lightning assembly of any cartridge with any stud, identifies power load, protects head and thread of stud during driving.

PRICE for Model 450 Remington Stud Driver complete in rugged steel carrying case—only $119.50.

How to operate the Model 450 Remington Stud Driver



Hand-assemble stud and power cartridge, load as unit in easy-to-open Stud Driver, close.

Press loaded Stud Driver firmly against working surface, depress safety button, pull trigger.

Explosive charge imbeds stud solidly. Open Stud Driver with twist of the wrist, eject empty shell, load again. Whole job takes seconds!

Speeds all these jobs . . . and many more

1. Hanging steel ash and door bucks to concrete and brick.
2. Anchoring wood plates to concrete floors and ceilings for setting partitions.
3. Fastening wood furring strips to concrete for attachment of metal lath.
4. Anchoring suspended ceilings, sprinkler systems and lighting fixtures to concrete.
5. Attaching conduit and panel boxes to steel and masonry.
6. Anchoring light machinery to concrete pads.
7. Erection of signs, awnings and venetian blinds on steel or masonry.
8. Hanging radiator housings to concrete or brick.

MAIL THIS COUPON TODAY FOR FURTHER INFORMATION

Remington Arms Company, Inc.
Industrial Tool Division
932 Barnum Ave., Bridgeport 2, Connecticut

I am interested in obtaining detailed information on the Model 450 Remington Stud Driver.

Name _____

Firm _____

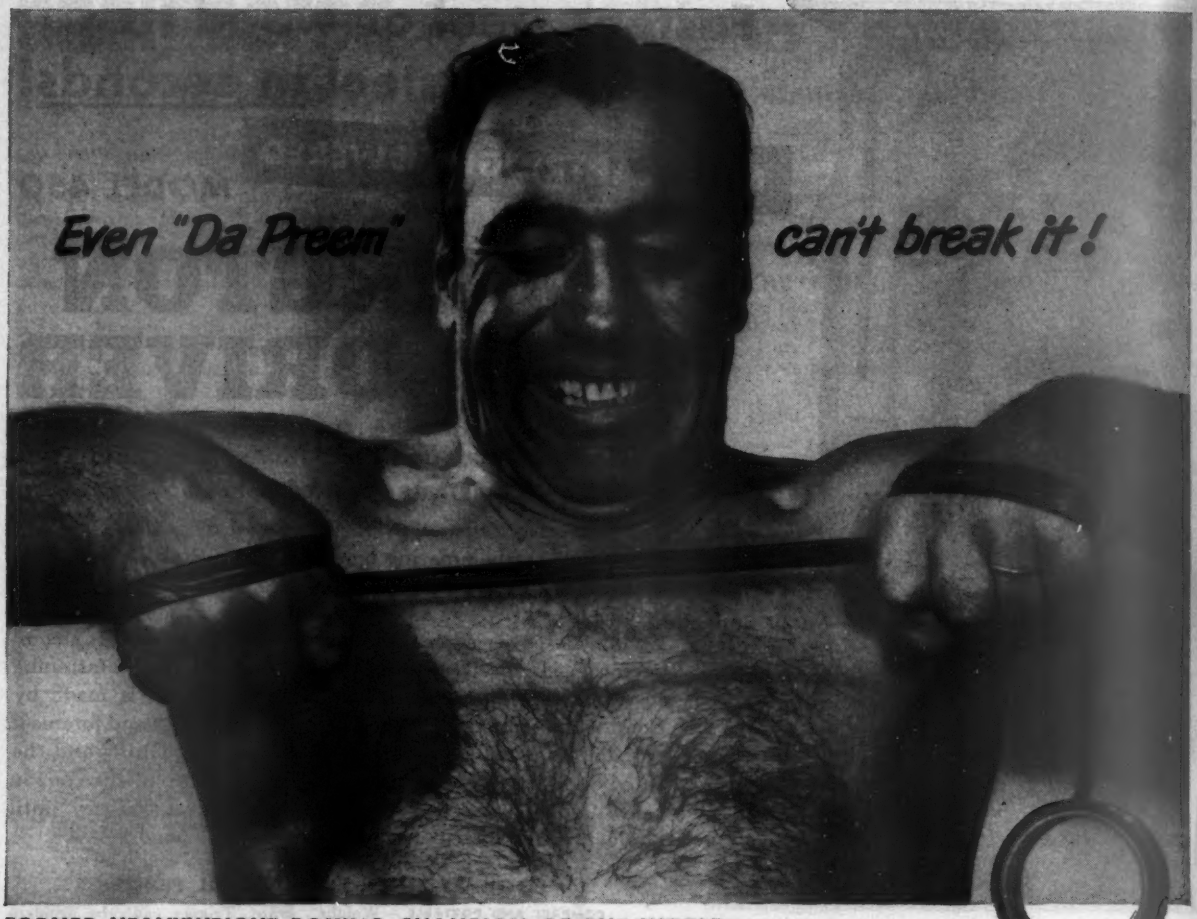
Position _____

Address _____

City _____ State _____

"If It's Remington—It's Right!"

Remington DU PONT



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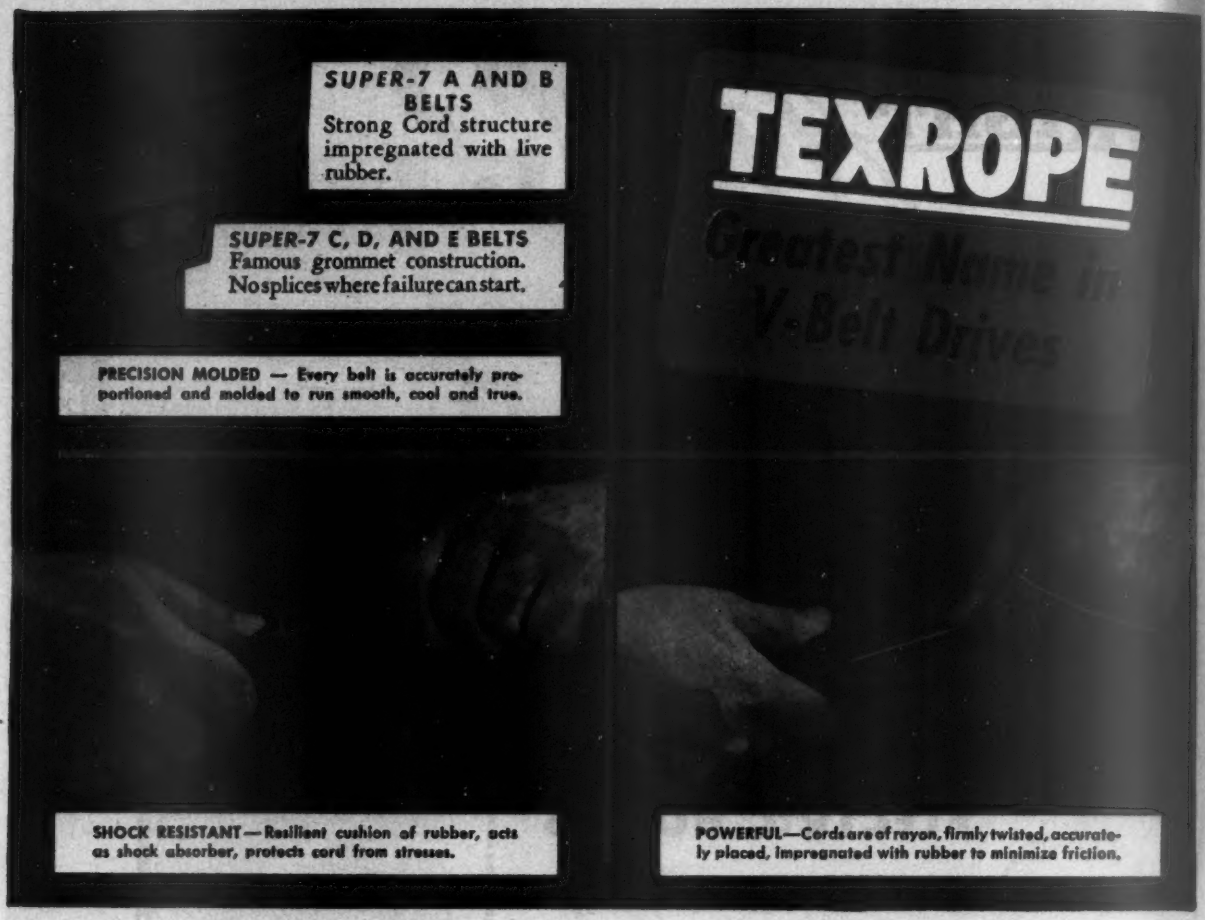
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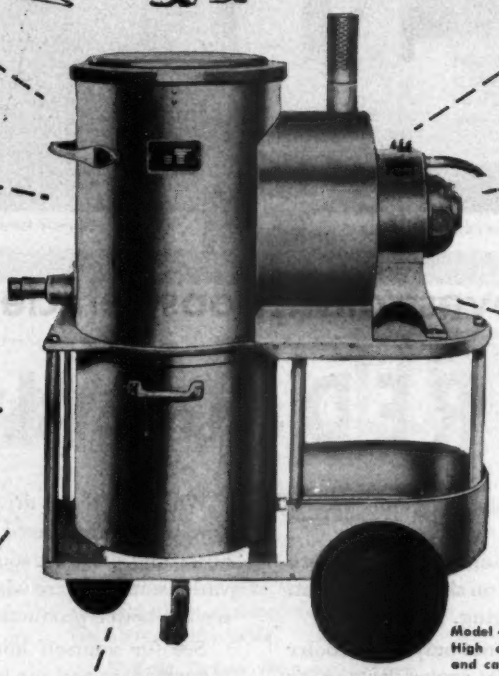

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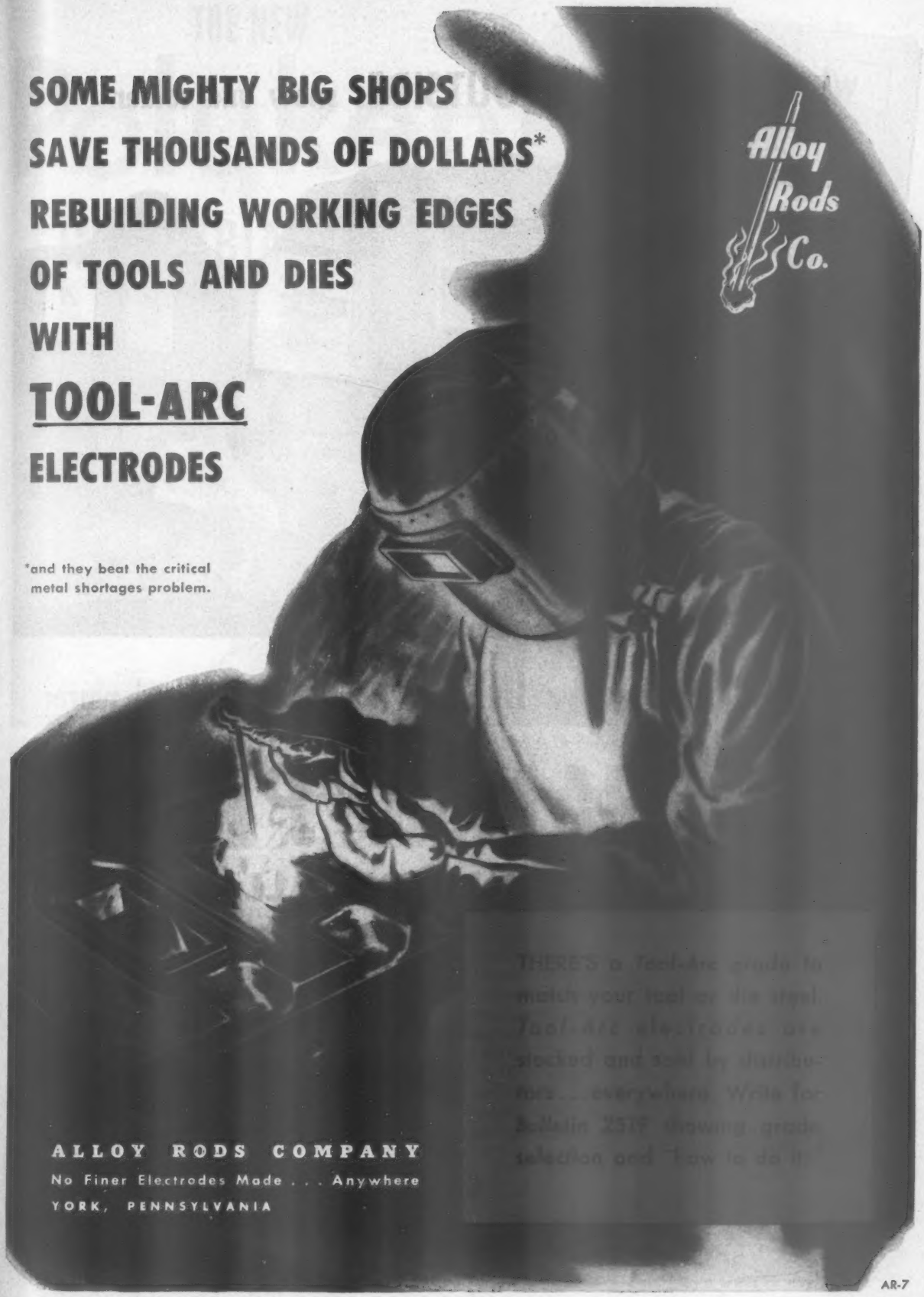

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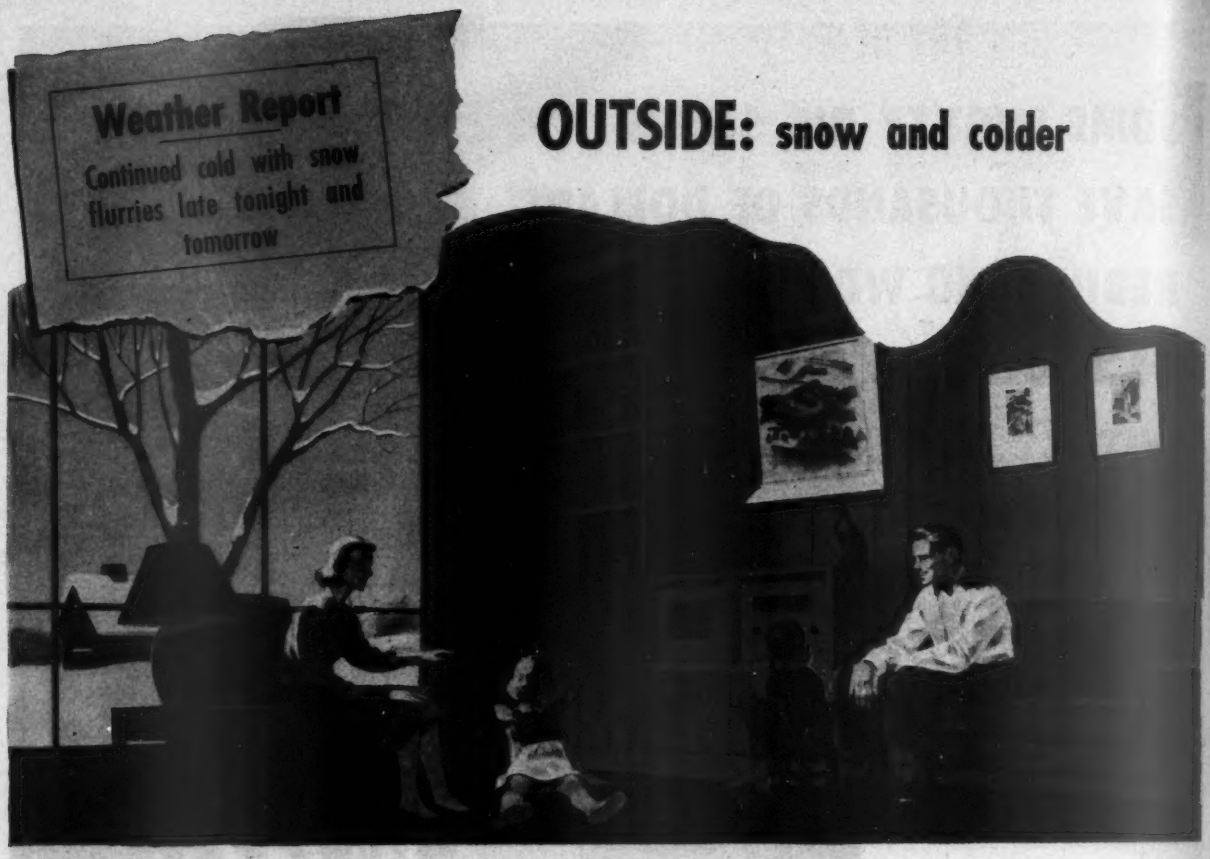

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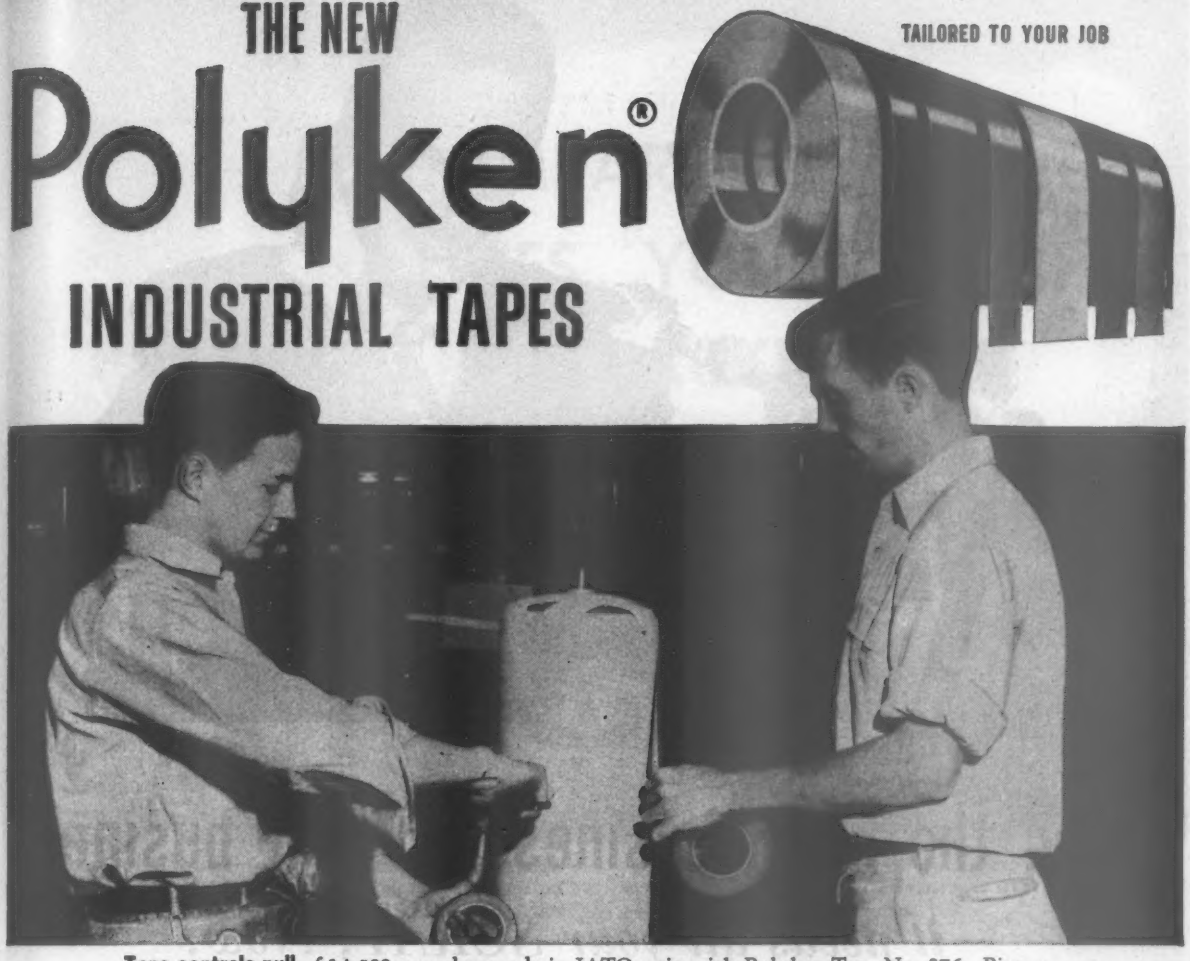

Tape controls pull of 14,500 pound-seconds in JATO unit with Polyken Tape No. 276. Picture taken at the Aerojet Engineering Corp.

Tape holds 18 times the force of gravity

Jet-assisted take-off gets planes air-borne in half the distance it used to take with propellers alone. But when the Aerojet Engineering Corp. first introduced its JATO (Jet-Assisted Take-Off) unit to aircraft, the terrific jet thrust tended to rip the unit apart—to rip the charge loose from its shell.

Aerojet engineers consulted with a Polyken Sales Engineer, who suggested Polyken No. 276—a Fiberglas*-backed tape—to bind the plug and cap assembly that secures the charge to the shell.

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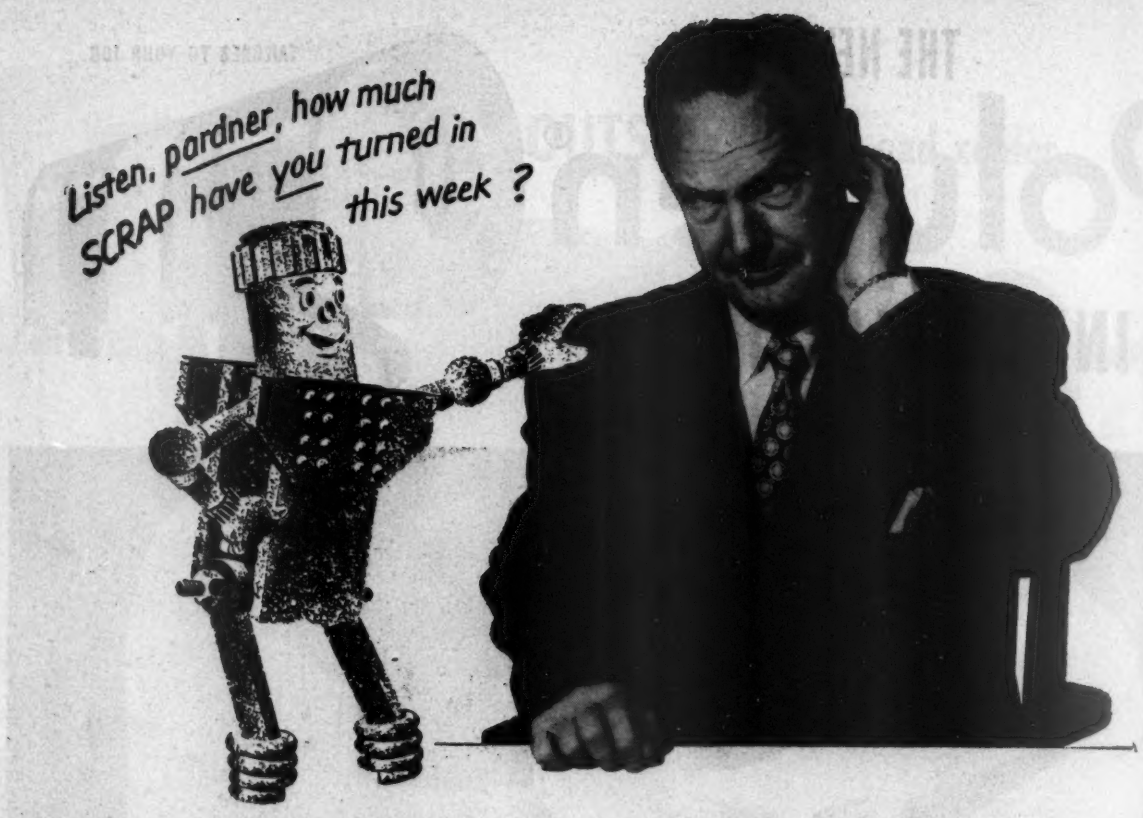

Today, the steel business is your business

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SUPPOSE that every steel user were suddenly told that he had to turn in a half-ton of scrap before he could get a ton of steel. It would start the most gosh-almighty treasure hunt for scrap that ever happened.

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The bulk of this scrap must come from industry. That's why we're asking for your all-out help. That's why it's so important that you make the drive for scrap part of your daily operations. Make it your business to encourage every employee to report any obsolete, broken or worn-out machinery, tool or equipment that has seen its day. From this dormant "junk" must come the heavy melting scrap that the mills need most. Don't let your scrap lie idle; send it on its way. How about it, pardner?

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

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but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

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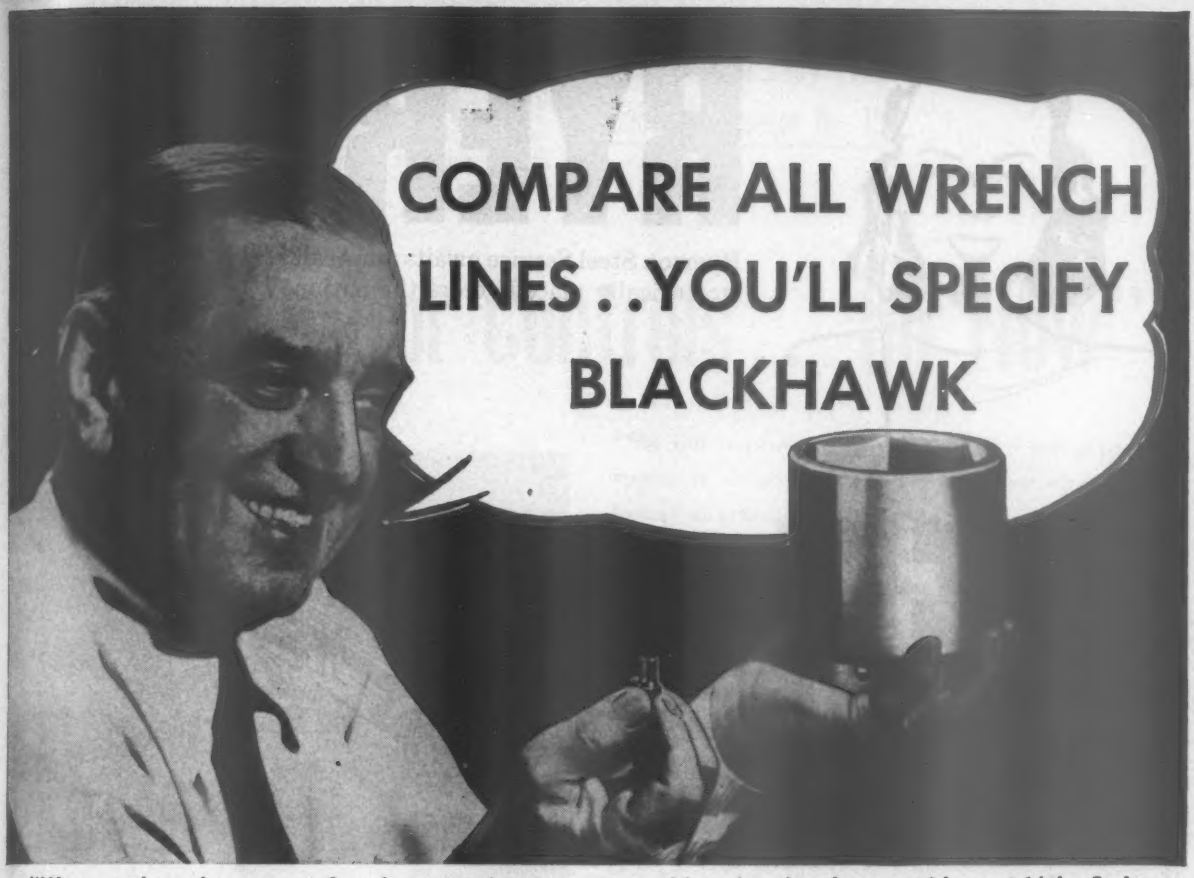
UNITED STATES STEEL



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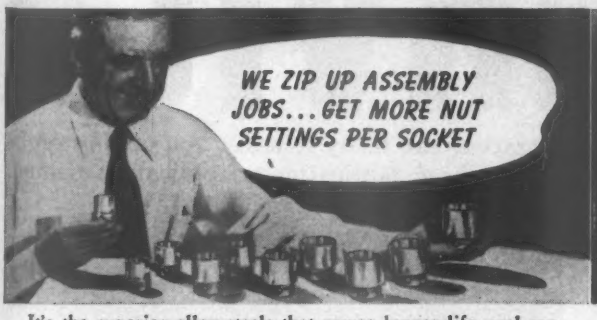

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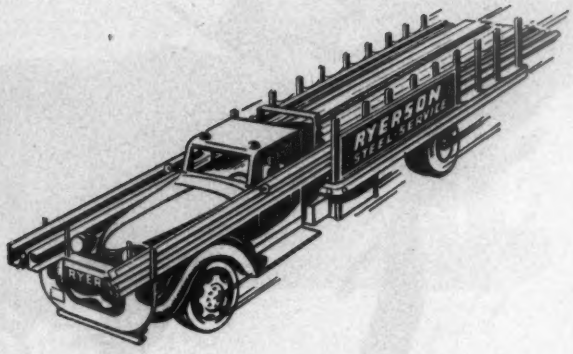

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MANAGEMENT and MAINTENANCE
WHAT YOU NEED TO KNOW FROM WASHINGTON ★ WHAT YOU NEED
Mobilization Communique No. 15

"Why I'm for Controls . . . for Now"

Acme

"My job is production—*period*. I'm not a professor of economics. I'm going to use whatever brand of economics I have to use to do the job of building America's might.

"Once that is done—when the fair day comes that America is prepared, if necessary, to fight an all-out war, when civilian production becomes normal, when the inflationary pressures are gone—you'll find Charlie Wilson the first to demand that the clamps be removed from our economy."

By CHARLES E. WILSON
Director of Defense Mobilization

WHEN THE PRESIDENT ASKED ME to take over the job of Director of Defense Mobilization, he was not looking for a political philosopher but for a production man. I say this because numerous attempts have been made to read political philosophy into a practical approach to the problems of defense mobilization.

So I'm a Captive?

I refer, of course, to the fact that the nature of my job compels me to favor a whole series of controls over our national economy and to the charge that this is at variance with my life-long belief in the principles of free enterprise. I am portrayed as a traitor to these principles. It is even darkly hinted that I am a captive of New Deal careerists.

Sometimes I wonder if people who juggle words in this way are aware of the nature of the crisis that confronts America or of the measures that are necessary to meet this crisis. Never before in history has the United States undertaken so vast an arms program in so-called peacetime.

In the first World War, more than two-and-a-half years elapsed between its outbreak and our participation. Likewise, in the second World War, we had a breathing spell of more than two years between the time it started and the time we got in. If a third World War should

Harris & Ewing

"The fact that somebody thinks controls are 'New Dealish,' or the fact that someone's profits are being curtailed, is not going to shake me one bit from my belief that controls are necessary at the present time."

International News

"In the administration of controls . . . I believe in flexibility. You cannot hold so complicated an organism as the American economy in an unyielding vise."

occur, there would be no period of grace for us to get ready.

We would be in the front lines at the very outset. There would be no one to hold off the enemy for an indefinite time until we got ready to fight. So our ability to fend off damaging or even fatal blows depends on the preparedness campaign in which we are now engaged.

History may record that this is the smartest thing the United States ever did. It took us a long time to recognize the danger of the Kaiser's Germany. It took us almost as long to awake up to the menace of Hitler. But I think the nation is not only keenly aware of the catastrophic threat offered by Communism, but also is determined to do something to combat it.

In the fascinating game of considering the "if's" of history, it has often been said that neither World War would have happened *if* the United States had been ready to fight, and *if* its intention of doing so had been made clearly evident to the enemy. However that may be, this time there is no doubt of United States policy.

That fact may spell the difference between peace and war. I've seen two world wars in my lifetime. I don't want to see a third. The only chance I see of avoiding world war is to build America's might to the point where no aggressor would dare attack us. It is that premise I bring daily to my tasks.

Controls Are Must's in War

It is obvious that war itself disturbs the normal economy of a nation so violently that controls are necessary. No one questions that. In war, national survival demands many measures a free country could never tolerate in normal times.

We take young men from their homes and draft them into the armed forces, where they face the possibility of death on the battlefield. We control industry so that those same young men will be assured weapons to fight with. And, because war creates unnatural shortages of many kinds, we take extraordinary steps to protect the economy from what otherwise would be the disastrous effects of those shortages.

Prelude to World War III?

While the nation is not engaged in a general war at this time, the nature of the crisis is such that we must act as if one were imminent. For more than a year we have been fighting a good-sized war in Korea. And it is recognized that, unless we are on guard, it may become the prelude to a world-wide conflict.

Hence we are operating under the same kind of conditions we would have in a wider war. We are conscripting young men not only to fight in Korea, but also to build up and maintain an armed force of some 3,500,000 men, a figure which approaches the entire number of Americans engaged in the first World War, and is a considerable fraction of the total in the second World War.

Is it conceivable that Congress would keep a conscription law on the books if the crisis were not real? By the same token, Congress passed the Defense Production Act in September, 1950, three months after the Korean war began, and extended it in July, 1951.

Acme

"We are only now entering the period when defense production is beginning to bite seriously into civilian goods."

This is the Act that authorizes controls over our economy—control over materials and control over prices, wages, and rents. Without this Act, defense mobilization would be impossible. It is the basic charter under which we operate.

I'm Facing the Facts of Life

The reason Congress (including men of both parties) passed the Act was not to further any political philosophy or to fasten any particular brand of economics upon the nation, but merely to face the facts of life, to meet the nation's practical necessities. It is in the same spirit that I am attempting to administer the Act.

Congress is appropriating nearly $60-billion for defense in this fiscal year. If we add the backlog of funds already appropriated and not yet spent, we have a figure of over $100-billion.

This enormous figure is of wartime proportions. It compares with the figures of wartime years, as follows: 1941, $12-billion; 1942, $94-billion; 1943, $66-billion; 1944, $95-billion; 1945, $84-billion. And because our defense expenditures are of wartime size, it follows that their impact upon the economy is quite as severe.

In other words, vast amounts of steel, copper, aluminum, and other metals and materials must be set aside to produce the weapons of modern warfare. Even the richest country in the world lacks a sufficient supply of these metals and materials to provide for defense needs, and at the same time operate a civilian economy at full tilt.

If we relied on free market practices, the Government would be competing with private industry for a supply of raw materials far below the demand. The result could only be fantastic price rises—and a condition of anarchy. The Government either would not obtain enough raw material for the needs of defense, or it would pay astronomical prices.

Two Kinds of Controls

This, of course, is primer stuff. But I cite it to illustrate a curious inconsistency in the debate over the whole question of economic controls that took place this summer before Congress extended the Defense Production Act.

That Act has two major sets of controls—those over materials, as administered by the National Production Authority of the Department of Commerce and the Defense Production Administration; and those over prices, wages, and credit, as administered by the Economic Stabilization Agency and the Federal Reserve Board.

There is no basic difference in philosophy between the two sets of controls, yet last summer's attacks were almost entirely centered on the second set. No voices were raised in opposition to controls over materials, nor did Congress ever consider any important change in this section of the Defense Production Act.

Unthinkable in Normal Times

The power over materials is actually a power of life or death over industry, because no industry can function if it is deprived of the raw stuff of which its products are made. To grant this power to the Government in ordinary times would be absolutely unthinkable. But the need for it was not seriously questioned in either of the Congressional debates over the Defense Production Act.

I do not see any difference in principle or theory between control of materials and control of prices, wages, rent, and credit. It is all part of the same pattern. If it is necessary to control materials, it is also necessary to safeguard other phases of the economy that are affected by shortages. Why one set of controls should be taken for granted and the other attacked, is to me inexplicable.

It simply stands to reason that when a large part of production is diverted from civilian channels to defense purposes, and when at the same time purchasing power is increased, enormous pressures are built up on the price of consumer goods.

Psychological Inflation

We saw this happen in 1950 which, by the way, was a record-breaking year for the production of civilian goods. Without controls, the cost of living soared. It rose 8% within a few months, under the impetus of the panic buying that occurred after the Korean war began. This is what might be called psychological inflation.

In January of this year, general price ceilings

were established. From February 15 on, the cost of living has risen only about 1%. The establishment of controls does not tell the whole story, because the leveling-off of the economy was accounted for also by the swollen inventories that had been accumulated in the fall and winter.

But from now on controls will play a far more important role because we are only entering the period when defense production is beginning to bite seriously into civilian goods.

Up to now, defense industry has been largely in the tooling-up stage. I have used the term "psychological inflation" for what happened last fall and winter because it was based on fright rather than on actual shortages. But from now on shortages will be real rather than imaginary, and hence the need for a firm rein on prices is imperative.

Let me point out one or two of the storm signals. Personal income has risen to an all-time high rate of more than $250-billion a year, as against $224.7-billion last year. The gross national product is at a rate of $325-billion, another all-time high. More than 60-million people hold jobs, and unemployment has practically reached the vanishing point. Purchasing power in the form of savings is mounting steadily.

Joe Stalin Would Win

And, while these pressures rise, civilian production is progressively decreasing. I shudder to think what would happen if the nation's enormous purchasing power were turned loose on a decreasing stock of things to buy. Prices would soar. The already staggering cost of the defense program would be increased by many billions. Increased taxes would be lost in the inflationary spiral. Enormous wage increases would have to be granted. People on fixed incomes would be wiped out. The stage would be set for national bankruptcy, and Joe Stalin would win a major victory without firing a shot.

Production Already at Peak

Occasionally I hear some theorist say that the cure for inflation is more production. Ordinarily that is as incontestable as a proposition by Euclid. But I wonder how it could be put into practical application in a country whose production facilities are already taxed to the utmost to turn out defense and civilian goods. Yes, even the seemingly limitless capacity of America for production is now being strained to the bursting point.

We are increasing capacity everywhere we can. It was once thought that a production of 100-million tons of steel a year was an unattainable goal. What would we do with all that steel? We now have a steel production of more than 100-million tons. We are shooting for 118-million tons. We are doubling our production of aluminum. We are increasing electric power production, oil drilling and refining, freight car construction—and in many other ways raising America's capacity.

But so much of this stepped-up output is going for tanks, planes, and guns, and other things people cannot buy, that shortages in civilian goods are inevitable. Therefore, the argument that production is the cure for inflation is particularly pointless at the present time.

I'm for Flexibility

In the administration of controls, which practical necessities demand, I believe in flexibility. You cannot hold so complicated an organism as the American economy in an unyielding vise. That is why, as soon as the price-freeze order of last January was announced, steps were being taken to remedy injustices. That process is still going on.

I should like to cite a particular case where controls were operating to hamstring an industry. I refer to the vital matter of machine tools. This industry is of the feast-or-famine variety. It boomed during World War II, but its business fell off badly when hostilities ceased. Now, once more, we are badly in need of machine tools—many of them of brand-new design.

As we entered the current crisis, the industry was depressed, and the price ceilings imposed upon it were calculated on a base period when orders had been few. To smash this potential bottleneck, we granted price relief, besides issuing superpriorities for raw materials, providing for adequate financing and an adequate supply of labor, and otherwise stimulating necessary production.

In this and other cases, where it is necessary to modify controls to speed production, we will not hesitate to do so. On the other hand, we intend to stick by tough controls despite pressure, no matter how heavily it is exercised or upon whom. The fact that somebody thinks controls are "New Dealish" or the fact that someone's profits are being curtailed, is not going to shake me one bit from my belief that controls are necessary at the present time.

My job is production—period. I'm not a professor of economics. I'm going to use whatever brand of economics I have to use to do the job of building America's might. Once that is done—when the fair day comes that America is prepared, if necessary, to fight an all-out war, when civilian production becomes normal, when the inflationary pressures are gone—you'll find Charlie Wilson the first to demand that the clamps be removed from our economy.

LOOKING AHEAD IN LABOR

Last-minute round-up as we go to press

More labor disputes will find their way to the Wage Stabilization Board. And WSB is getting ready for them.

Plans are now being made on how big strikes will be handled—short of a Taft-Hartley injunction—under the Truman plan. WSB's new disputes officer, Peter Seitz, is in charge. He was Cyrus Ching's assistant at the Conciliation Service, handled strike troubles for the old War Labor Board.

WSB hopes to have alternative methods for use in different situations. Sometimes it will use an all-public panel of experts. Sometimes a tri-partite panel. Sometimes it may hear a dispute directly, without using a panel.

This much is sure: WSB will not consider a dispute while a strike is in progress. It made this clear in sending the nationwide copper dispute back to the White House. Truman then got a Taft-Hartley injunction, ended the strike for at least 80 days.

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WSB can get into a dispute in only one of two ways:

- Either Truman must refer it to WSB as seriously affecting national defense; then the Board may recommend "fair and equitable" settlement terms.
- Or a company and union jointly may request WSB to hear their dispute. In these cases, WSB won't order a settlement unless both ask for it.

But WSB will not accept just any dispute submitted voluntarily. It will reject, and has rejected, those that do not have a sufficient impact on national defense, or where bargaining, mediation, or other steps available have not been utilized fully.

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WSB recognizes that its wage policies often are the very cause of strikes and misunderstanding. That's why it issued this code for guidance to company and union negotiators:

- Be careful in making agreements that obviously can't be approved under wage-control rules. They raise false hopes among workers, create unrest.
- There is no restriction on bargaining and arguing (1) over what WSB will approve or (2) that an exception to the rules should be asked of WSB.
- You may make any kind of wage agreement. But remember: You may only pay wages that have WSB's OK.

These big strikes, all over wages, were headed for WSB if not settled soon:

- Wright Aeronautical—UAW-CIO called 10,000 Wood-Ridge workers out September 25.
- Douglas Aircraft — 9000 out in UAW-CIO strike at Long Beach since Sept. 5.
- Brown & Sharpe — 43,000 machine-tool workers called out Aug. 2 by International Association of Machinists.

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It will be Walter Reuther against the field as jockeying begins in CIO's hierarchy for Philip Murray's post as CIO boss next year. Reuther, the ablest CIO union chief, is disliked by other CIO leaders. They can block him if they can get together on someone else.

A new group of labor leaders is waiting to take over from the "old guard." Murray, quitting at 65, is the youngest of labor's "big five." There aren't many years of active labor leadership left for William Green, 78; Big Bill Hutcheson, 77; Dan Tobin, 75; and John L. Lewis, 71.

AFL's vocal secretary-treasurer, George Meany, hopes to step into Green's shoes next year. Dave Beck is Tobin's heir-apparent. John Owens is today's best bet to succeed Lewis. The field against Reuther for CIO presidency includes James Carey, Allen Haywood, Joseph Curran, Jacob Potofsky.

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Unions plan to press harder for a guaranteed annual wage. It is a live issue in meatpacking. Murray will raise it again in steel this winter. At General Motors, a management-union committee makes it more palatable at this time.

Left-wing unions, kicked out of CIO, talk again of forming a new labor organization under Lewis. There is a chance they may unify, but Lewis won't be connected with the group.

Lewis and the left-wing both hate the Truman administration, want to abolish wage controls. But Lewis won't make another deal with the Commies, as he did in starting the CIO.

LOOKING AHEAD IN BUSINESS

Last-minute round-up as we go to press

The U. S. has announced it is starting to produce an atomic-powered plane and submarine. Key Senators are calling for a six-fold increase in the atomic energy budget. They foresee the hydrogen bomb, atomic warheads for artillery, small atomic bombs—and other weapons on a huge scale.

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Which raises the question: What about dispersion policy for industry?

Last month President Truman announced a new—but modest—policy. (For details, see page 130.) This is a far step from other recommendations by the government.

In 1948 the National Security Resources Board recommended that, wherever possible, areas of industrial concentration should be held to less than 5 square miles, or located in population centers of less than 50,000, separated by a minimum of 10 miles of relatively open country.

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There's no doubt concentration is a problem—and federal policies haven't changed it much. The bulk of the new defense plants are going to areas where concentration is greatest now.

Roughly 60% of the $6.2-billion of rapid-amortization permits that have been approved has gone to seven states—including five of the big seven industrial states — Pennsylvania, Texas, Ohio, Michigan, Connecticut, California, Illinois.

So federal policies haven't yet changed the pattern of concentration in industry very much. In fact, the concentration is building up in many of the areas that military officials feel are most vulnerable to attack.

On the other hand, industry can't ignore the facts of materials, labor, and markets. Wyoming, for example, simply won't be a major steel center because it doesn't have the key materials or trained workers.

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So what can industry do? Really thorough dispersal—spacing plants widely through areas least vulnerable to air attack—is out of the question. It would cost, by one expert's estimate, at least $100-billion.

At the other extreme, the President's policy of merely spacing out locations of new plants is only one step. It may reduce the toll that any one bomb attack might take, but it won't affect the fact that half of our industrial capacity is located in a half-dozen states.

This is a problem that military officials, the President, and Congress will be working over for months and years to come. But it's clearly a top-drawer problem for management right now.

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Keep your eye on productivity and savings as two important guides to your business plans.

Productivity surged mightily in 1950. Bureau of Labor Statistics reports gains in output per man-hour ranging up to 22% in 26 industries. With scattered reports from other industries, it looks as if productivity jumped as much as 8% last year —far more than in other postwar years.

Big question: Will gains like that continue now? You may see the answer right in your own plant.

Mobilization makes it harder to boost productivity. Efficiency will drop in many civilian plants as material limitations pull output down. And production of weapons—in many cases—is just getting underway. There, efficiency will be low.

But steady gains—even though they are moderate —will go a long way in helping the U. S. to handle mobilization demands and to hold down prices. And they can make all the difference in any one company's operating results in the next two years.

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Savings are a key to markets — and to holding down prices. Customers have been building up bank balances since spring—and taken off the buying pressure that forced prices up last fall.

But a new wave of buying pressure—particularly one that comes early next year when inventories of autos and appliances will be low—might bring inflationary pressures to a boil again.

•

Meanwhile, look for a high level of fall sales and a big Christmas—more like the normal fall pick-up than an inflationary wave.

Large or small—you can PROTECT FANS and HOUSINGS with PLIOWELD

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SMALL OR LARGE, you can apply PLIOWELD lining to most metal surfaces. Goodyear equipment includes 15' diameter X 45' long vulcanizer—capable of handling equipment which can be transported.

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THE G.T.M. SPECIFIES PLIOWELD

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WHEREVER you use an air stream to move corrosive fumes, you can assure yourself of longer, lower-cost service by coating impellers, fan blades, housings and duct work with PLIOWELD.

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Wherever you handle acids, alkalies, salts, or corrosive fumes, it will pay you to consult the G.T.M. about PLIOWELD—developed by Goodyear, a leader in bonding metal to rubber. Ask the G.T.M. about your problem, or write Goodyear, Akron 16, Ohio.

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It's the combination of Texaco Lubricants—noted for quality—and Texaco Lubrication Engineering Service—noted for know-how—that has put Texaco out front everywhere. In many fields the preference for Texaco predominates. The Diesel field, cited in the following paragraph, is a good example.

More stationary Diesel h.p. and more railroad Diesel locomotives in the U. S. are lubricated with Texaco than with any other brand.

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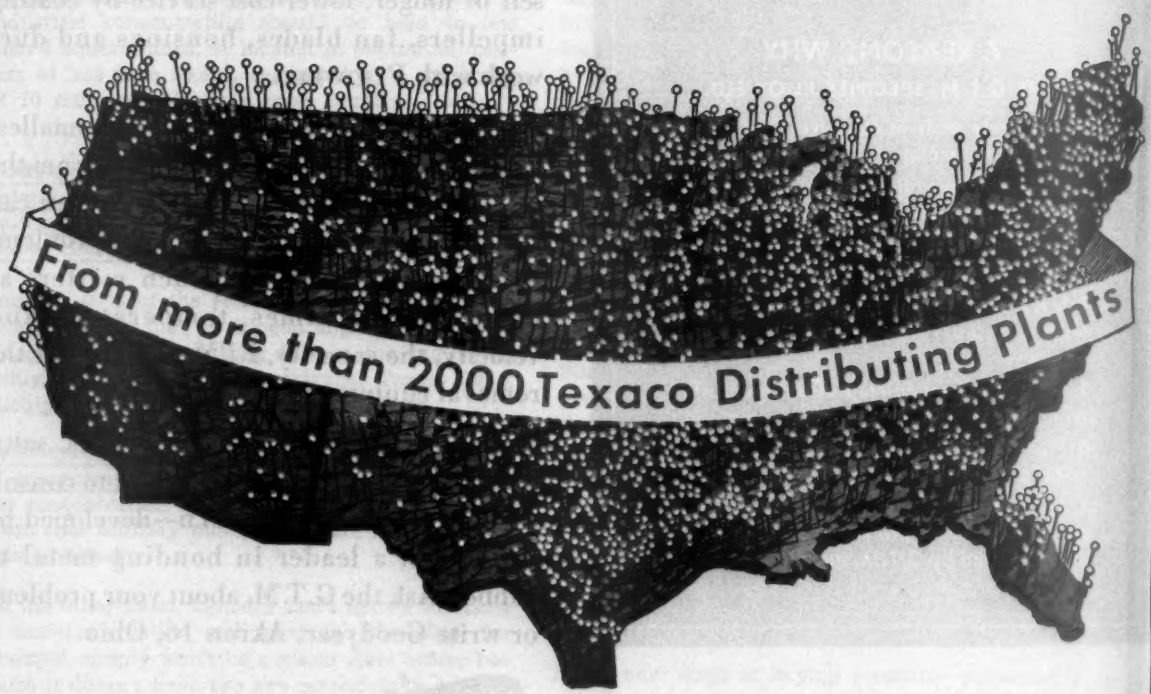

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LUBRICANTS, FUELS AND LUBRICATION ENGINEERING SERVICE

Here's a Matter of Plain Good Business

THIS IS THE MONTH of the United Red Feather Campaigns in most communities. You have had many reminders from your newspapers, radios, or television screens. Perhaps you've been solicited personally by one of the campaign workers. If you work in a big plant, you've probably had a Red Feather message from a Vice-President-in-Charge-of-Something-or-Other.

On the basis of these appeals, you've no doubt decided by now that you will make the contribution you can afford.

So we'd like to discuss here for a moment a different aspect of the United Campaign—the fact that it's *united.*

Have you ever thought what this means to you? In the first place, there's the matter of personal convenience. A *united* campaign cuts to a minimum the number of appeals made to you by charity and service organizations. It's not just a matter of the annoyance of a multiplicity of appeals. There's the fact that, with fewer "drives" to consider, you can plan donations for a year with some assurance that you are spreading the money systematically.

In the second place, a *united* campaign helps to keep your plant running smoothly. It cuts down the number of solicitations that outsiders ask to make in the plant—or ask your people to make for them. Such solicitations take the time not only of your production labor, but also of executives. Nobody wants to duck the responsibility of his company for worth-while charities, but any plant executive has a right to expect the same efficiency from these fund-raising campaigns that he is striving for in his own production operations. One of the best ways to get this efficiency is by a united effort in solicitation.

So we think you have a double stake in the United Red Feather Campaign:

1. To give generously—thereby helping to maintain the worth-while charities, and encouraging them to feel that they get adequate funds when they throw in their lot with a *united* drive.

2. To encourage the *united* idea—making it obvious to charity and service organizations that you, personally, and your plant favor a one-solicitation-for-all program.

We think such a program is plain good business for you—and for the charities.

You'll have *more time for reading.*

You'll get *more ideas from reading.* That's why

you'll find it pays to learn...

How to Read Faster and Better

By THEODORE A. CONNETT • Former Acting Director, Reading Institute, New York University, N. Y.

YOU'LL GET TWO BIG REWARDS out of improving your reading skill:

More time for reading • Say your reading rate is now 200 words per minute (average for executives). In two hours you'll read 24,000 words. Now, say you increase your speed to 400 words a minute (which isn't unreasonable). Result: The same amount of reading in *half* the time—or *twice* the amount in the same time. Take your choice.

More ideas • Speed alone is meaningless. Reading is worth only what it means in ideas. To stay in business and prosper, you have to know what's going on, come up with new ideas, out-think your competition. Fortunately, building up your reading skill results in better *comprehension* as well as greater speed. So you don't have to sacrifice ideas to cover more words. In fact, by training yourself to read more skillfully, you should be able to *triple* the number of ideas you get every day.

What can you do to improve your reading skill? If you're lucky, you may already be such a good reader that you don't have to do anything.

If you're not so lucky—which is more probable—you can do a lot to help yourself. That's because good reading is a *skill* that can be learned.

But it's not easy. You don't learn to break par just by buying a set of fancy golf clubs. The game requires concentration and practice. So does reading, if you want to read well.

If you're willing to devote as much time and effort to your reading for the next six months as you do to your golf or other hobby, you'll be going places. Unless you're already exceptionally good, chances are you'll end up reading better and faster—for ideas and for profit.

1 · Find out how well you're reading now

This is obviously the first step. You must know how fast you can read and how well you can comprehend before you can do anything else. Without such information, you wouldn't know how far you needed to go, or how much progress you were making in getting there.

A good first step in sizing yourself up is to take the reading test on the opposite page. Read the passage (be sure you follow directions for recording time). Then answer the questions on page 86. Instructions given with the scoring key tell you how to work up three measures of reading skill:

- Reading speed (in words per minute)
- Reading comprehension (in per cent)
- Reading index (speed-accuracy score)

When you've taken the test, you'll have a fair idea of how good a reader you are right now. If you want more information, check with your local school or college authorities. They'll tell you where you can take a scientifically standardized test, based on research involving thousands of cases. The test used here wasn't set up that way. It was especially created for this article, to give you an idea of how such tests work, and to help you get a rough check on your reading skill.

How good a reader are you? Take this reading test before you turn the page

READING TEST:

Why Controls Are Necessary

For the next few years we must not only tolerate but also help to make effective a whole battery of emergency government controls.

After our military victory in World War II, we rushed through a demobilization that cut our military strength to about one-tenth of its wartime peak. With prodigious speed we switched from military to civilian production and went on to enjoy a rousing post-war boom —the greatest in our history. On June 25 last year, our industrial production was rolling along at almost twice its pre-war level.

When the North Koreans smashed into South Korea, they drove this fact home:

If we want to save our national freedom from destruction by Communist aggression, we must race to restore some of the military power we wrote off so speedily after World War II.

Compared with our military effort in World War II, the mobilization on which we are now embarked is small. At its peak, under present schedules, it will absorb no more than one-fifth of the total national production. During World War II we reached a point when nearly half of our total production went for war-making.

Moreover, our economy now is bigger and stronger. The capacity of our industrial establishment is two-thirds again as great as it was then.

Given time, the industrial giant we have created could pick up in its stride the added load of defense production now contemplated. But speed is of the very essence. If we are to stand off Russian aggression successfully, we have, at the outside, two years in which to get ready.

IT'S CONTROLS—OR CHAOS

These two facts—(1) the necessity for speed in our rearmament program and (2) an economy already stretched taut by a record civilian boom—create the general necessity for government controls. If we simply piled the billions of added defense expenditures authorized since last June on top of the civilian boom, there would be a scramble for scarce materials, notably metals. And prices would go through the roof.

Our situation during this mobilization is far different from what it was when we rushed to get ready for World War II. Then we started with an economy that was coming out of a long depression. There was plenty of slack. Today we find our economy operating virtually at capacity.

The selection and administration of controls thus far has been badly bungled. Indeed, we could readily assemble a long catalog of deficiencies. But that would not dispose of the necessity for controls—by priority, by allocation, and, as a stop-gap, by direct prescription of selling prices—if we are to carry out our mobilization successfully.

HOPE IN THE WILSON PLAN

Since he became Director of Mobilization, Charles E. Wilson has added a new element of order and hopefulness to the mobilization program. He has laid out a plan which, if we are spared all-out war, would do three things by 1953: (1) produce the weapons needed by our army and our allies to meet an immediate threat; (2) create the capacity that would enable us to move at high speed into weapons production for all-out war—if necessary; (3) create the additional production capacity that would restore our ability to resume the climb of the civilian standard of living.

In technical and industrial terms the Wilson Plan seems to be feasible. If it is successfully carried out, we should be able to begin getting rid of controls rapidly by 1953. But to carry out the program successfully, it must now have vigorous support from everyone. That does not mean mere agreement that it is a good plan. It means that we must conform to the controls that are necessary to make the plan work. In developing this support, the business community is in position to exercise crucially important leadership.

TO TEST YOUR READING ABILITY . . .

READ THE PASSAGE ABOVE at your normal rate of speed for such material. Record exact reading time in minutes and seconds; use a stopwatch or watch with second hand. When you have finished reading, answer the ten questions on page 86.

2 · Make sure you know what you're trying to do

Reading is a complicated process. So, once you know how well you read, you need to understand enough about the process to be able to "diagnose" your weaknesses.

The key point is the simple fact that reading isn't just a matter of "seeing words." You read to get *meanings*—to understand what the writer has to tell you. When you read, you *think*. Of course, you *do* have to see the words before you can understand them. So there are two ways in which your reading can get off the beam:

1. You may be weak on the mechanical or "seeing" phase.
2. You may be weak on the mental or "thinking" phase.

THE SEEING PHASE OF READING · This naturally comes first. To do a good job here, your eyes must be *able* to see. That means regular eye examinations by a qualified doctor. The older you get, the more often you ought to be examined. If you need glasses, get them—*and wear them*. Obvious? Of course. But too many people in all walks of life should be wearing glasses, but aren't. Be sure you're not one of them.

Once you're sure you're able to see, the next step is how to do it. In reading, your eyes move across the printed page in a series of jerks and stops, called "fixations." It's during the fixations that you actually see what's written. You get only a blur while the eye is moving.

QUESTIONS FOR READING TEST ON PAGE 85

1 What is this editorial mainly about?

——a) the Wilson Plan
——b) why we must have controls and help make them work
——c) why controls are not necessary
——d) controls today compared with those of World War II

2 How much did we cut our military strength after World War II?

——a) 90% ——b) 60%
——c) 80% ——d) 10%

3 How many times greater was our total industrial production in June, 1951, when the Korean War broke out, than it was during the pre-war level?

——a) 2x ——b) 4x ——c) 3x ——d) 5x

4 How much of the total production will the present mobilization absorb at its peak?

——a) 50% ——b) 30%
——c) 40% ——d) 20%

5 How much has total production capacity of our industrial establishment increased in the past decade?

——a) 67% ——b) 40%
——c) 20% ——d) 30%

6 What reasons does the writer give to support his conclusion that controls are necessary?

——a) need for patriotism; danger of inflation
——b) need for speed for war; a strained economy
——c) scarcity of materials; consumer demand
——d) economy of scarcity during war; possibility of depression

7 In respect to the need for controls during mobilization, why is our situation today different from what it was during World War II?

——a) less demand for consumer goods
——b) our economy not operating at capacity
——c) more demand for scarce materials on part of industry
——d) economy is operating almost at capacity

8 What is the writer's attitude concerning the present system of controls?

——a) unfair to business but fair to consumer
——b) poorly selected but well administered
——c) poorly selected and poorly administered
——d) selected well but poorly administered

9 What is the writer's reaction to the Wilson Plan?

——a) technically and industrially feasible
——b) technically but not industrially feasible
——c) industrially but not technically feasible
——d) doomed to failure unless industry and consumer get behind it

10 What does the writer think the Wilson Plan will do?

——a) produce weapons for present; create capacity for future civilian and war needs
——b) produce weapons for future but not for present; create capacity for future civilian needs
——c) produce weapons for the present but not for future; create capacity for better civilian standard of living
——d) produce weapons for present; cut future civilian output; cut red tape in Washington

SCORING KEY ON PAGE 89

Fortunately, you don't have to stop for each letter or word. If you did, you'd be making so many fixations that you'd never get anything read. The eye can pick up words on each side of the fixation point, and thus see several words at once. For example, you can read "units of production" in one fixation. The eye focuses on "of" but also takes in "units" and "production." The length of the line you can pick up in one fixation is called the "eye span." Obviously, it's good to have a large eye span. The bigger it is, the fewer fixations you'll have to make per line of reading. And the faster you'll be able to read.

Most poor readers have a limited eye span, and use six or more fixations for most of their reading, regardless of what kind it is, or how hard it is. Actually, you should be able to read most "light" material (like fiction) with only three stops per line. For technical material that calls for accurate remembering, you will probably need four stops, as a rule.

THE THINKING PHASE OF READING · Here — especially in your business reading—is where you get your pay-off. Your reading can be mechanically perfect. But you can still have trouble getting the meaning of what you have read.

Reading can't take place in a vacuum. You can't think unless you have something to think about. You have to have a question you want answered, a problem you want solved, an idea you want sparked, a principle you want to grasp. In other words, you need a *purpose* for your reading. If you don't make up your mind as to *why* you're reading a specific article, and what you *want*, you're likely to get little meaning out of it.

Your aim must be to form a "partnership" with the writer. You should be thinking with him, and even ahead of him. That way, reading gets to be dynamic, lively, productive. You can't do this kind of reading reclining back on the middle of your spine with your feet on the desk. *It's work.* But it gets results.

Of course, you also have to have information to think with. The less well-informed you are, the poorer your vocabulary, the tougher your reading problem. Reading itself is, of course, part of the answer to this problem. The more you read, actively and alertly, the better informed you'll be. Improving your vocabulary is a simple matter in practice. The main requirement is to be interested enough to keep at it over a long period of time.

3 · Practice skimming

Skimming is a special kind of ultra-high-speed reading. Some experts, in fact, don't even consider it reading at all. It's like skimming the cream from the top of a pail of milk. You deliberately take only the heavy top layer. Similarly, in reading you skim off only the "heavy" ideas—the key thoughts. With this technique, you can easily cover 1000 words per minute.

But skimming should be used carefully. If you skimmed everything, you'd miss many ideas.

WHEN TO SKIM · In general, you'll find skimming most useful as your "advance scout." You skim to decide whether you ought to go back and give the article, report, or page a rapid reading (which is quite different from skimming). If you do decide you want to read the material, you will have a good idea of how it's organized. You get a rough "blueprint" from the skimming that helps you to get meanings faster, and see relationships between main ideas and details.

You'll also find skimming helpful when you're trying to locate some specific reference, or the answer to a question. And, for reading instructions, you'll find that an initial skimming is good. You want to get the general "feel" to start with. Then you can get a lot more out of your rapid reading.

Careful writing and editing will make your job of skimming much easier. The better business magazines are good examples. They use highly descriptive headlines, often followed by a few sentences in big type that tell you a lot about what the writer has to say. They break up the material into sections, and tell the main points of each section with bigger, darker type. And they cut down on the number of words, to save your reading time. This article illustrates a number of these techniques. For example, it was approximately five times as long in its original form. As now set up, it's easy to skim and also easy to read rapidly.

HOW TO SKIM · There are three ways to skim, depending on your purpose:

1. Skimming for gist of article: Read vertically. Just run your eyes down the center of each page or column, zigzagging from left to right, picking up key words. Practice with a newspaper. Draw a line down the center of each column. Then run through the story at high speed. Try to get the general idea just by looking at verbs and nouns on each side of the line. Pay no attention to adjectives, adverbs, prepositions, or articles.

2. Skimming for trend of thought: Helpful where you want to take a quick look at what the author *believes* or *thinks* about something. Read horizontally, but again look only for key words. You'll probably want to pick up an occasional adjective and adverb, in addition to the main verbs and nouns. That's because writers usually qualify their opinions and conclusions. Don't worry about facts and reasons in this kind of skimming. Keep looking for those big generalizations or conclusions. That's all you want at this point.

3. Skimming for main ideas: Helpful where paragraphs are longer, and author has organized fairly well, with introduction, body, and ending. Read horizontally. Look for main ideas in first and

last sentences of paragraphs (where many authors put them). Look at main headings, bold-face (black) type. Skip all the details and facts used to support conclusions. Watch for signal words, like "first," "second," "most important," "therefore," and "finally." If you've skimmed properly, you won't know *why* the author said what he said. But you should be able to make a passable outline of the main ideas he tried to get across.

4 · Practice rapid reading

Most of us read slowly because we're afraid we'll miss something important if we speed up. If that's the way *you* feel, forget it. There's no basis for such fear. Many, many people have learned that their understanding *increases* as they speed up their reading. There's nothing mysterious about it. Forcing yourself to read faster makes you read in "thought units" or phrases, instead of plodding along word-by-word. Your eye span is necessarily greater, and you make fewer stops or "fixations."

WHEN TO READ RAPIDLY · If you're a good reader, you'll read as fast as you can all the time. But that doesn't mean that you'll always be reading at the same rate. You will vary your speed according to your purpose and the type of material you're reading. If you want to go deeply into complicated material, you'll be much slower than if you're reading fiction for pleasure.

Most good readers read between 300 and 400 words per minute. If they skim complex material first, they can keep this pace generally even for such reading. And, for light reading, they can get up to 600 or 700 words a minute. Claims of speeds up 1000 words a minute are usually based on skimming techniques, not rapid reading.

HOW TO READ RAPIDLY · Here are nine things you can do to improve your reading speed and comprehension (remember, you want *both*):

1. Read to solve a problem. Always have a purpose in mind when you read. Your ability to grasp ideas, to see relationships, will be greatly increased when you know *why* you're reading and *what* you're looking for.

2. Try to out-think the author. When you're able to predict what's coming, you're proving you've grasped what has been said to date. But even if you can't "outguess" the author, you will benefit from trying. The effort keeps you on your toes, makes you more alert to the ways in which the author organizes and expresses his ideas.

3. Read under pressure. Force yourself to read faster than is comfortable. The mere fact that you're *trying* to read faster helps you build up your speed. Set time limits and goals for yourself. For example, decide to read a certain report in the 20 or 30 minutes just before lunch. And by all means get off the back of your neck when you read. Some readers actually stand. Others use stiff-backed chairs, or lean forward over the desk. Too much comfort leads to sleep, not active reading.

4. Concentrate when you read. Contrary to popular belief, the worst enemies to concentration aren't outside distractions. You should keep these to a minimum, of course—especially while you're campaigning to improve your reading. But the big job is to control your *internal* distractions. These are the idle thoughts (daydreams, too), "mental notes," sudden recollections, and brilliant ideas you may experience while reading. To read well, you *must* get these pesky mental distractions under control. Try reading with a notebook beside you. Jot 'em down as they occur to you. Then you'll remember to think about them later, at the proper time.

5. Read silently. This is tougher than you think, if you're in the habit of pronouncing words to yourself as you read. It's a bad habit, since oral reading speeds are much slower than silent speeds. Concentrate on just *seeing* the words on the page, with immediate recognition of meaning. You should never let yourself "hear" words as you read. If you keep putting the pressure on yourself, you'll gradually beat the bad habit into submission.

6. Read thought units, not words. That's the way to improve your eye movements and eye span. Reading separate words takes away meaning, forces you to work harder to put them back together mentally. Take the first part of the last sentence, for example: There are two units—"reading separate words" and "takes away meaning." Split up differently (like this, for example: "reading separate," "words takes," "away meaning") the words make little sense.

Practice will help you with reading mechanics. Try this daily bout with a newspaper or magazine: Draw two lines down each column of print, thus dividing the column into three parts. Focus your eyes where the pencil line crosses the line of print, allowing yourself only two fixations per line. If you use a book, draw three lines (four for large pages). Keep at it regularly. You'll improve.

7. Develop "visual shortcuts". You'll find that you can quickly get in the habit of recognizing words by their general shape ("configuration"). It's called your "sight recognition vocabulary." You don't have to look nearly as carefully as you might think to know what a word is—unless, of course, it's entirely unfamiliar. For example, you'll probably have no trouble with these words: man-f--t--ing; ind-p--d--t; b--k--pt d-f-c-t. The words, of course, are *manufacturing, independent, bankrupt,* and *deficit.* This is another skill you can practice. It's interesting to see how many letters you can take out of a word without spoiling its "sight recognition" qualities.

8. Develop a good meaning vocabulary. Nothing is worse for good reading than not knowing what words mean. There are many ways to lick this

problem. The simplest, probably, is to get in the habit of writing down every new word you run into. Keep some 3x5 cards handy. Put the new word on one side of a card. On the other side, write the meaning, plus a sentence in which the word is used correctly. Check over your cards regularly, and test yourself. Also try to use the new word in a sentence at least once a week. File the card in a dead file when you have correctly defined it, without help, for four successive weeks.

Don't stop to look up new words while you're reading. Merely check the line where the word occurs. Look it up later. Meanwhile, try to guess the meaning from the context. Sometimes you'll find it defined for you later. You can also look for roots and basic words in larger words. But don't stop too long to analyze, unless you're reading for minute details, or to follow instructions.

9. Practice, practice, practice. There's no shortcut. *You* must work. And right now is a good time to start. Pick several articles out of this issue of FACTORY. Skim each article rapidly first for main ideas. Keep it short—certainly under a minute. Then note down the time before you start rapid reading. Then read as fast as you can, keeping in mind that you want to be able to answer specific questions about the article. When you finish, note the time again. Count the words, and compute your reading rate. (Why not test yourself on four articles in this issue of FACTORY? Here are word-counts: article on pages 108 to 110—1737 words; pages 126 to 129—1608 words (not including "Answers"); pages 130 to 131—621 words; pages 136 to 138—1880 words.) Keep a record of your reading rates. Over a period of weeks, you'll be able to measure your progress. It will be *good* progress, too—if you stick with it.

You'll probably be discouraged with your progress in rapid reading for a time. You'll find that you're too conscious of *how* you read, instead of *what* you read. That's a common experience. It should be no cause for giving up. Keep at it. You will get over the temporary confusion. And you will find that you have *more time for reading*, and *more ideas from reading*.

5 · Get outside help

It's evident that there's a limit to what any one person can do for himself on his own. We're generally lazy animals; we need help and guidance and encouragement. So the question is:

Can you get any outside help to improve reading—for yourself, and for others in your company?

The answer is *yes.* Interest in giving adults organized training in reading skills has grown in recent years. It has resulted from realization of the great losses in personal efficiency that poor reading can cause.

In the larger cities it's possible to find reading specialists who can give the necessary training and guidance. Some of these specialists are connected with universities. Others have set up in business as consultants. Many offer special courses for adults. They have special equipment that simplifies certain phases of reading training: special films that present reading materials in thought units at controlled speeds; exposure devices (tachistoscopes) that help increase the eye span by flashing numbers, letters, and words for short periods of time; and various other devices, including cameras for recording eye fixations.

For those who can't get to well-equipped training centers, the answer is company-sponsored training programs. Such programs have already been tried in a few companies, like Johnson & Johnson, Standard Oil Development Company, and New York Life Insurance Company. It's far too early to judge the possible future of this approach, but it does deserve close study. As business pressure on operating executives grows, your efficiency must grow. And good reading is the backbone of efficiency.

READING TEST ANSWERS AND SCORING KEY

Q	A	CREDIT	Q	A	CREDIT
1	b	20%	6	b	20%
2	a	5%	7	d	10%
3	a	5%	8	c	10%
4	d	5%	9	a	10%
5	a	5%	10	a	10%

Instructions for figuring reading speed and reading index scores

Reading Speed Score: Figure the number of full 10-second periods you need to complete the reading. For example, the figure would be 10 if you took 1 minute and 45 seconds. Divide this number into the total number of words in the selection (640 words). Then multiply by 6. Example:

Reading rate equals number of words (640) divided by number of 10-second periods (10) times 6. This equals 64x6. Answer: 384 words per minute.

Reading Index Score: Figure the Reading Index by multiplying your reading speed by the per cent comprehension score you got on the reading test, and then divide by 100. Example, assuming a comprehension score of 80% on the test questions:

Reading Index equals 384 times 80 divided by 100. This equals 30,720 divided by 100, or 307.2.

Below is a table of reading indexes, with ratings for different ranges of index values. (Note: Do not figure reading index if your reading comprehension score is below 75%):

400 up (excellent), 300-399 (very good), 250-299 (fair), 200-249 (average), 150-199 (poor), below 150 (very poor).

CASES IN METHODS IMPROVEMENT

PESCO PRODUCTS DIVISION, BORG-WAGNER CORP.

BEDFORD, OHIO

Keeping Methods in Step With Product Improvement

... is vital enough to interest the top man at Pesco Products. R. J. Minshall, president, personally coordinates the work of methods men in the never-ending search for new ways to save time and cut costs —and improve the quality of the product.

It's their job, as Minshall sees it, to keep pace with product designers who are constantly engineering into Pesco motors, pumps, and valves better ways to deliver pressurized power and controlled flow.

And they *do* keep pace, as witness these eight improvements a FACTORY field editor picked out of the Pesco files.

LIGHT ON LEAKS

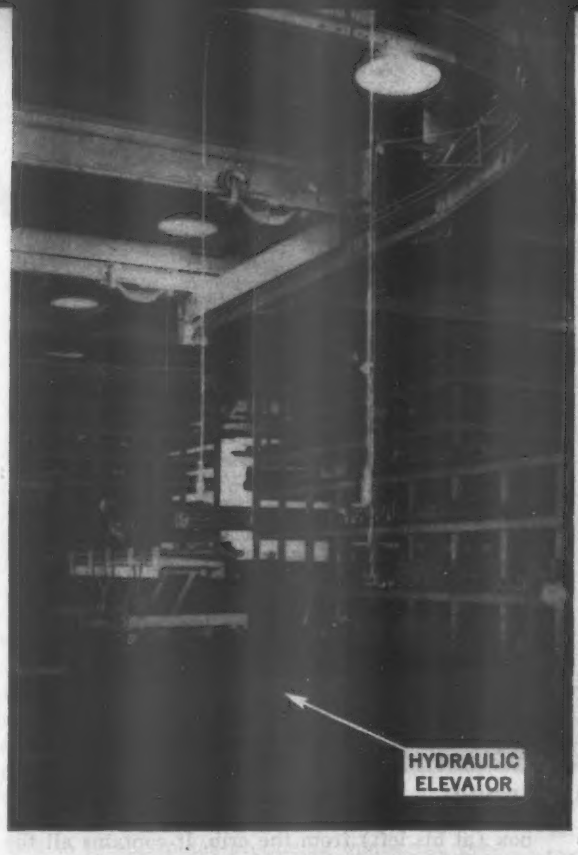
Pesco uses clear plastic for hydrostatic test tanks to find leaks in pumps and other assemblies. Tank top is flush with the top of the inspector's table. A fluorescent tube is mounted at each end of the tank. Light from the tube passes through the water and highlights escaping air bubbles as the assemblies are pressure-tested. Air bubbles lighted from side are more easily spotted than bubbles lighted from above (as tubes were previously mounted). Surface reflections are eliminated.

The new tank has shaved inspection time and improved the percentage of leaks detected. Here an inspector looks for bubbles from a pump.

ON-THE-JOB INSPECTION

Manufacturing precision demands a surface flatness of only two light bands' variance on gear faces. That's only 0.0000231 inch. Such precision is too fine to be checked by visual methods or normal measuring devices. So each gear must be checked with a quartz crystal under monochromatic light. Formerly, gears were sent to the inspection area.

Now necessary inspection equipment is attached to the operator's machine. He inspects each gear as he completes it. Then it goes right to the next operation. There's no time lost in handling and rehandling. To settle any quality questions that may come up, there's a floor inspector on the job.



TRUCK FOR BAR STOCK

Bar stock is delivered to Pesco by highway trucks. At the dock, stock is unloaded by a hoist on an overhead rail and placed on a flat truck. The truck is raised to the right rack height by a hydraulic elevator. Bars can be pushed right from the truck onto the rack without lifting.

When stock is needed at a screw machine, a materials handler slides it off the rack onto the same truck, lowers the hydraulic elevator, and tows the truck to the machine by fork truck. At the machine, the truck's elevating mechanism keeps stock at convenient work level. One man can slide the stock into spindles.

Before Pesco got the truck, two men were needed for this materials handling job. Now one man does it.

METAL-BEARING SLUDGE OUT

Two gear shavers were put close together, and a magnetic coolant separator was installed between them. Cutting oil from the shavers flows through the separator. A magnetic drum revolves in the settling tank and picks up metal-bearing sludge as it settles to the bottom. A shoe scrapes the sludge off the drum and drops it into a chip box.

Pesco finds that the separator keeps the cutting oil completely free of metal chips. Cutting oil lasts longer. Cooling lines don't clog up with sludge. Maintenance on lines is reduced. Gear surfaces are better.

TAPE INSTEAD OF FIXTURES

Pressure-sensitive tapes are doing a lot of unusual jobs these days. Here's another one for the book.

The tape used here has adhesive on both sides. Strips of tape are pressed onto the face plate of a surface grinder and nonferrous parts are stuck to the exposed face. The tape holds the parts firm and true during grinding.

Pesco finds the tape does a good job for short runs and experimental jobs. It has eliminated the expensive holding fixtures previously needed. *More on next page*

DOWNTIME DOWN

As the turret lathe operator at the right winds up a production run, the set-up man on the left has the tools ready that the operator will need for the next run. That's how Pesco minimizes machine downtime. The set-up man draws a special tool box (at his left) from the crib. It contains all the tools he'll need.

A complete set of tools for each job the company has is kept in a separate box in the tool crib. When a new job is to be run, it's easy to make the set-up.

HEATERS OFF THE FLOOR

Putting two electric water heaters above the cafeteria entrance saves Pesco valuable floor space for cafeteria service. And it puts to work some out-of-the-way and otherwise unusable space.

The heaters are easily reached for inspection and maintenance. Putting them close to the kitchen cut down on the piping, means hot water at a turn of the tap.

JAVA IN A HURRY

Employees want quick cafeteria service. They get it at Pesco. The company is always looking for something that will speed up in-plant feeding.

This coffee-and-dessert table is a good example. Employees who bring their own lunches used to have to stand in the regular cafeteria line if they wanted coffee or dessert. Not now. They can pick up either or both in a hurry.

STANDARDIZATION . . . SUREST WAY TODAY TO GET

More for Your Inventory Dollar

Standardizing the raw materials that go into your inventory will lower costs through higher turnover—and get you more mileage out of the limited inventories permitted by NPA.

By G. M. BARROW • Engineering Department
Meter Division, Westinghouse Electric Corporation
Newark, N. J.

INVENTORY CONTROL, in the usual sense, is applied only to the materials you carry in stock. But *preceding* this control is the engineering involved in the selection and specification of the materials themselves. This is the control of *what gets into inventory*, rather than the control of *stock in inventory*.

What you can accomplish by standardization is shown by the common metals used in fabricated products. Sheet and strip constitute the bulk of this material by volume, if not by weight.

A helpful guide is available to aid in the selection of required thickness or gage of this material: *The American Standards Preferred Thickness of Uncoated Metals, ASA Standard B32.1.* It is subscribed to by the metal-producing industries, provides what can be considered standards for thickness of sheet and strip. It lists 34 sizes for uncoated metals less than 0.250-in. thick.

Instead of being restrictive, the value of the standards lies in the elimination of other and odd sizes that can be substituted or grouped into those that are retained. Thus in one grouping of gage sizes there are thicknesses of 0.0475, 0.049, 0.050, 0.051, 0.052 inch, and in another 0.0625, 0.063, 0.0635, 0.064, 0.065 inch.

In most applications, no difficulty would be anticipated by reducing the first group to 0.050-in., and the second group to 0.063-in. thick. Both are preferred sizes. So two standard sizes are kept; eight non-standard sizes are eliminated.

The reclassification of a typical brass account illustrates how the plan operates. Table I shows the inventory status of sheet and strip *before* and *after* reclassifying thicknesses. (The number of accounts differs from number of thicknesses because each width in a given size is a separate account.)

The figures show a modest reduction in total number of sizes, but a more significant one in number of ledger accounts because duplicate widths were eliminated within each group.

Table I is based on an assumed total consumption of 400,000 pounds per year. Assuming a turnover rate before reclassification on standard-size material of approximately 5.7, the 225,000 pounds represent a storeroom stock of 40,000 pounds. On non-standard sizes the turnover approximated 4.0. On 175,000 pounds, this represents a stock of 44,000 pounds. That makes a total of 84,000 pounds for average current stock.

The turnover rate of 4.0, applied to the 63,000-pound reduction in the yearly total of non-standard sizes, represents current reduction of 16,000 pounds. This reduces the average current stock, after reclassification, from 84,000 pounds to 68,000 pounds. Actually, the reduction is greater.

Taking the low-activity items out of the non-standard sizes leaves fewer and more active items. This increased the rate of turnover to approximately 5.0. Applied to a yearly total of 112,000 pounds this gives a current average stock of 22,000 pounds. The increase in the number of standard sizes adds on the order of 5% to the stock of standard-size material, increasing it to 42,000 pounds. On a yearly total of 288,000 pounds, this gives a turnover rate of almost 7.0. A summary of inventory position before and after reclassification is shown in Table II.

TABLE I—What Standardization Does

SIZES	BEFORE		AFTER	
	No.	%	No.	%
Standard	14	43	21	75
Non-standard	19	57	7	25
TOTAL	33		28	
STOCK ACCOUNTS (including widths)				
	No.	%	No.	%
Standard	46	62	46	75
Non-standard	28	38	15	25
TOTAL	74		61	
USAGE	1000 LB.	%	1000 LB.	%
Standard	225	56	228	72
Non-standard	175	44	112	28

TABLE II—How It Pays Off

Stock std. sizes	40,000 lb.	42,000 lb.
Stock non-std. sizes	44,000 lb.	22,000 lb.
TOTAL	84,000 lb.	64,000 lb.
REDUCTION		20,000 – 25%
Turnover rate, std.	5.7	7.0
Turnover rate, non-std.	4.0	5.0

IDEAS OF THE MONTH for

By LEWIS K. URQUHART • Managing Editor, FACTORY

NEW SOLDERING PLIERS hold the work — and heat it. They're specially designed to speed wiring assemblies on the production line. Low-voltage current through the plier tips supplies the heat. Solder won't stick to pliers because they're made of aluminum alloy. St. Jonh Engineering Co., 4131 Lankershim Blvd., N. Hollywood, Calif.

BONE UP before you bid on defense contracts. Study "How to Be Cleared for Handling Classified Military Information Within Industry." 10¢. Supt. of Documents, U.S. Government Printing Office, Washington 25, D. C.

DY-CHEK, that dye-penetrant inspection process developed by Northrop Aircraft, Inc., will be manufactured and marketed under exclusive license by Turco Products, Inc., Los Angeles. Dy-chek, in case you missed its announcement some months ago, uses a red dye to detect cracks or flaws in metal that are too small to be seen with a magnifying glass.

NEW SLIDE CHART quickly identifies right stainless steel fastening—nut, screw, bolt, etc.—to fit an AN specification. Get yours from Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y.

QUIK-MASKS will cure any lingering desire you may have to cut your own. They come pre-cut to any size or shape you need. Self-adhesive. For samples, write W. H. Brady Co., Dept. 195, Chippewa Falls, Wis.

USING RADIOISOTOPES? Tracerlab, Inc., 130 High St., Boston 10, has a new Alpha Beta Gamma Survey Meter that will help you check glassware, benchtops, hands, coats, etc. Or locate small amounts of spilled radiochemicals. You can also use it to locate radium, to monitor amount of radiation from Oak Ridge isotope shipments, to measure dosage rates from stored radioisotopes, to ascertain whether shielding is adequate.

TURN A KNOB on the Ayers Calculer-D payroll tax machine to get Federal old age benefit and withholding tax deductions. It's made of Celanese acetate plastic. $18.75. Kirk Plastics Co., Los Angeles.

BOOKLET-OF-THE-MONTH is plainly "Blueprints for Faster, Better Production" (Behr-Manning, Troy N. Y.). Shows you how to mechanize some of those hand-finishing operations that make life so difficult.

WITH VISIBLE-TIP FOLLOW-UP FOLDERS you can't forget to remember. Visible-index label shows you what records are kept in the folder. Visible-tip colored signal tells you when to take appropriate action. Remington Rand Inc., 315 Fourth Ave., New York 10.

FIBERSTRAP is just the thing for packages weighing less than 90 lb. (on which NPA Order M-59 says no steel strapping). Comes in standard ¾-in. width, 0.040 in. thick. Available in 25-lb. coils, 1750 ft. long. A. J. Gerrard & Co., 1950 N. Hawthorne Ave., Melrose Park, Ill.

Factory Executives

HOW TO FRAME, hang, mount, and support mechanical and electrical equipment. Practically all you need to know. In a new 78-page booklet. Unistrut Products Co., 1013 W. Washington Blvd. Chicago 7.

TRICKS OF SCAFFOLDING is a new brochure that will help you solve some of your tougher scaffolding jobs the Ezebilt-no-bolts-no-loose-parts way. Universal Mfg. Corp., Zelienople, Pa.

TWO CREAMS will take care of 90% of your skin irritation problems. That's the claim made by The Boyer-Campbell Co., 6540 St. Antoine St., Detroit 2, for its "Skin-Cotes." S-C#1 is oil repellent. S-C#3 is water repellent.

GPX is plastic-surfaced plywood produced by Georgia-Pacific Plywood Co., Marsh St., Port Newark, N. J. It has many industrial uses. For instance, in foundries. Cooper-Alloy Foundry (Hillside, N. J.) used to mount most of its patterns on conventional 2-ft. matchboard that cost $15 to make. Now it's producing the same matchboard from GPX for $2.40. That's not all. GPX needs no finishing. Doesn't warp or crack. Wet sand doesn't stick to it. It doesn't absorb moisture.

WHAT SAFETY CLOTHING for what hazard is quickly determined from a checkchart in "Loss Control" (Aug. 1951) published by American Mutual Liability Insurance Co., 142 Berkeley St., Boston 16.

MINIMIZE STEEL WASTE with "Tables of Multiple Lengths." Free. U.S. Steel Co., Room 4284, 525 William Penn Place Bldg., Pittsburgh 30. They show the exact size of any given number of lengths that can be cut from a longer length.

MOVABLE PARTITIONS (The E. F. Hauserman Co., 6800 Grant Ave, Cleveland 5) can be had in 140 standard wall and trim colors. The company will send you a color selector that gives you actual light-reflecting value on metal surfaces for each of the 140 colors.

STRETCHRITE is a burlap and cotton tubing that stretches tight over bales of all shapes and sizes. You pull it over your bale the same way you pull on your sock. Made in sizes from 13½ to 80 inches. Gitlin Bag Co., P. O. Box 1060, Newark, N. J.

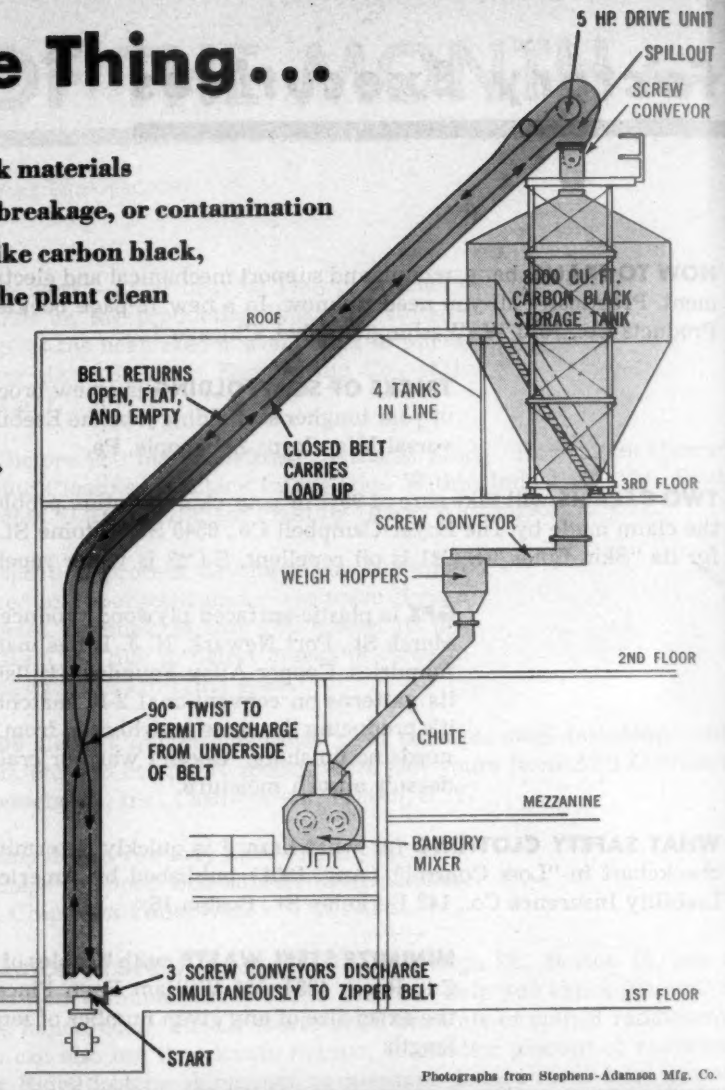
ERECTOSEMBLY is a made-to-order work station that combines bench and bins in approved motion-economy fashion. About $100. Coleman-Petersen Corp., 2110 St. Clair Ave., Cleveland.

COBALT-PLATINUM MAGNET developed by General Electric scientists is less powerful than Alnico-5 magnets in large sizes, more powerful in small. They say the new magnet in about the size of an eraser on your lead pencil has 24 times the lifting power of an Alnico-5 magnet in the same size. And about 8 times more resistance to demagnetization.

Zipper's the Thing...

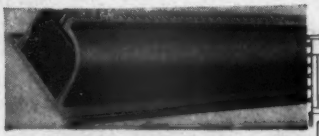
. . . when you have to handle bulk materials and protect them from spillage, breakage, or contamination . . . or when, as with something like carbon black, it's primarily a case of keeping the plant clean

TYPICAL ZIPPER SYSTEM looks like this one recently installed at the B. F. Goodrich Company.



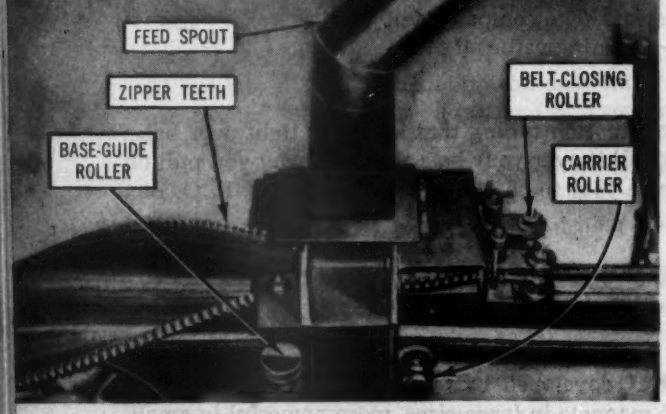
HERE'S HOW IT WORKS

EMPTY · It looks just like the zipper on your pants. But here the zipper moves, the slide stays put.

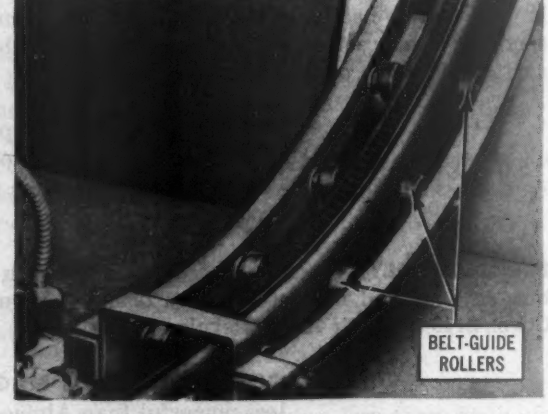


FULL · It's a U-shaped pipe that will move powder, dust, or pellets up steep inclines, around corners.

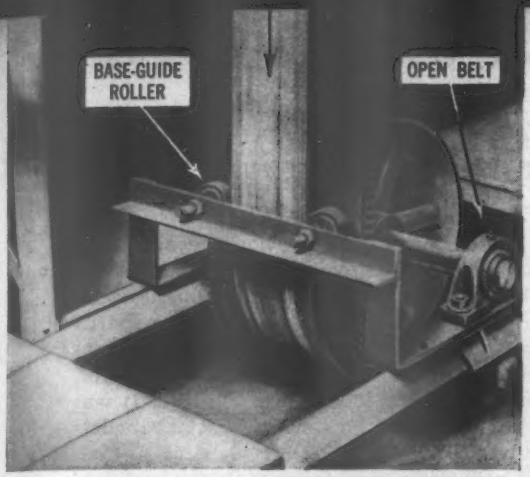
Photographs from Stephens-Adamson Mfg. Co.



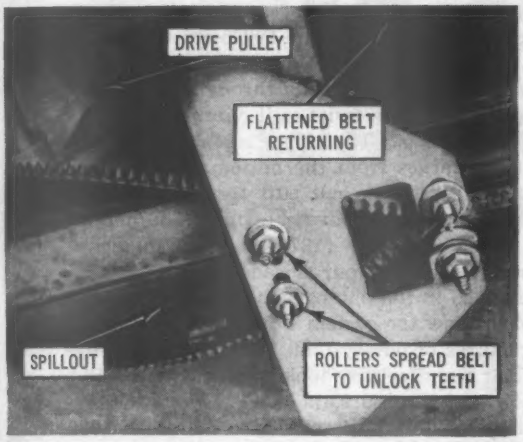
HOW IT'S FILLED AND CLOSED · Carbon black pellets are fed to the zipper conveyor by hopper and spout. Closing rollers right behind the spout mesh the teeth and close the belt. From here on it's a closed tube.



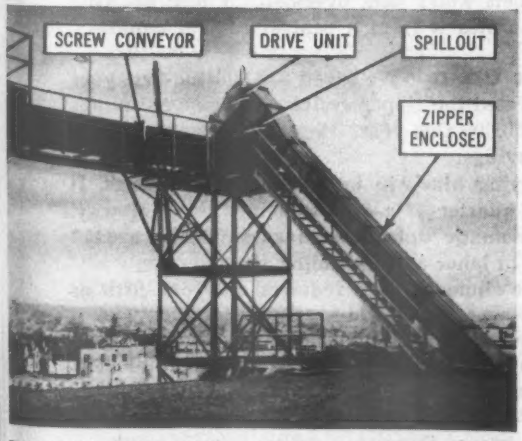
HOW IT TURNS CORNERS · Rollers guide belt around corners, keeping it centered at all times. As belt rises, full loading prevents black from slipping back. Vanes prevent back-slip at spillout point.



HOW IT RETURNS • As belt passes around drive, guide rollers keep it aligned. It remains flat until it reaches the fill-point. Returning the belt flat increases the life of the Neoprene belting.



HOW IT'S OPENED • Here you're underneath the belt looking up at the spill-out point. Spreading wheels open the belt and the carbon black falls out by gravity. Drive pulley flattens belt for return.



HOW IT'S ENCLOSED • Above roof-level, conveyor is enclosed in a metal housing. Doors permit easy inspection and maintenance. The 5-hp. drive unit, at the top of the rise, is also enclosed.

IT'S AN EASY JOB TO REPAIR THE ZIPPER CONVEYOR

BELT CAN BE REPAIRED IN PLACE. Here the plies of one end of the belt are stepped down. The two ends are fitted snugly together for . . .

. . . VULCANIZING BY PORTABLE MACHINE. The heated Neoprene splice is as good as new. Only one repair has been made on the B. F. Goodrich system, and that repair was made right after installation.

Please turn the page to see why Goodrich selected a zipper belt.

Our Zipper Belt Returned First Cost the First Year

By EDWARD E. FORSYTHE
Process Engineer, Processing Division
The B. F. Goodrich Company

WE THINK WE'VE HIT ON A NEW WAY to handle carbon black that's better than any other. It's the zipper-belt way. We've been using it more than a year.

Cost records show we saved $36,000 the first twelve months. That's more than enough to pay for the equipment and its installation. And we have a cleaner plant, too.

I'd better point out right now that, even though we supplied the manufacturer with the fabric and rubber for the zipper belt, we paid full price for it. Savings were not conditional upon a more favorable price than *you* might pay for such a system.

WHY WE CHOSE IT · With the advent of new types of carbon blacks, we found that the screw conveyors broke down the pellets and created a lot of problems in dispersion of black throughout the rubber. It also resulted in a lot of fines, which overloaded the conveyor. So we considered:

New screw conveyors · Equipment and installation costs were too high. Pellets would still break down in conveying. Power costs were excessive.

Belt and bucket conveyors · Cost was twice that of the zipper conveyor. Buckets would crush the pellets. Maintenance problems would be too great. And chances were good that the carbon black would get contaminated.

Air conveyors · Cost, again, was twice that for the zipper system. And it was too difficult to separate the black from the air at the point of use. Pellets would break down in high-velocity air.

All these methods had their good points, so we actually got cost estimates on each of them. However, coupled with other disadvantages was the fact that we faced extensive building changes if any of these systems was selected. So we finally decided:

The zipper conveyor was our best bet · We ripped out nine 12-in. screw conveyors used for horizontal and vertical handling in a conventional screw conveyor system. And we installed a 330-ft. endless zipper conveyor belt.

HOW IT WORKS · The schematic diagram on page 96 shows how we move carbon black from special tank cars on our rail siding to roof-level storage tanks 80 feet above the siding.

Two sections of the old screw conveyor system were not replaced. Matter of fact, we found them completely compatible with the new zipper system. Both are horizontal sections. And in our research we found that, by feeding a small amount of pelletized black into a large horizontal screw conveyor, a minimum of pellet breakdown occurred. It was in vertical conveying by screws that the pellets were pulverized.

Black now flows out of the tank car and into three 12-in. screws below ground level. They carry the black a short distance into our building to three unloading points. The zipper belt passes beneath these three outlets. We've set the screw discharge rate so each outlet adds a little black to the zipper conveyor. At the last point the zipper is filled and closed for its run up to the roof.

The zipper climbs vertically through three floors and is given a 90-deg. twist as it climbs and turns. Reason for the twist: The zipper is loaded from the top, but discharges from the bottom.

After the twist, the belt cuts through the roof to the spill-out point above a hopper. The hopper feeds a screw conveyor (187 feet long, 18 inches in diameter) that fills four storage tanks.

You noticed in the photographs on the two foregoing pages how the system works. Actually, those aren't pictures of our system. They're pictures the zipper-belt manufacturer took in other plants. But they look just like ours.

The zipper-belt's best record, to date, is 60,000 pounds of carbon black unloaded in 3 hours and 50 minutes. If black would flow faster from the cars, the zipper could take care of it. Present belt speed is 192 feet per minute. It could be speeded up.

The belt won't jam, overload, or foul up. One man operates it from a central control panel.

WHY WE LIKE IT · We saved $36,000 the first year we operated the zipper system. We expect savings to be $50,000 this year. Here's how we're getting these savings:

- **Buying black in bulk instead of in bags. It costs a quarter-of-a-cent-a-pound less that way.**
- **Automatic unloading of cars will save $117 per car in labor and unloading time.**
- **The zipper system requires only one-fifth as much power as the old screw system.**
- **Product quality will be better.**
- **Plant will stay clean, saving maintenance.**
- **Carbon black is a lubricant. That means bearings on our system are sealed for life and we don't have to grease them.**
- **The zipper hugs the wall throughout its rise, so we can use the floor space occupied by the screws for other purposes.**

"Most of those jobs out there in the shop were made by him."

"The Sales Manager Gets Too Much Money"

By RAY W. SHERMAN

TOBIAS QUINT sat on a desk in a cubicle labeled "Thomas R. Callahan, Foreman." To sit in the chair would have been destructive of tradition and morale in Central Manufacturing.

Hazing of a new man always included: "One—why does Central have foremen? Two—why do foremen have desks?"

Answers: "One—so the plant manager will have somebody to bum chewing tobacco off of. Two—so he'll have some place to sit and chew it."

Keen eyes in the plant manager's leathery wrinkled face looked down the production line to a gray-haired man who talked over the shoulder of a worker. Toby could see the lips of a passing man move, the foreman's eyes turn toward the office, and Old Tom Callahan start ambling down the floor.

"Hi, Tom!" The wrinkles smiled. "How's the belt?"

Slowly Old Tom began to rumble: "It's OK, Toby." From a drawer he drew a plug and handed it to the plant manager. "Sometimes bench men don't warm up to belts very fast. But it'll work."

The plant manager parked a nugget of plug where his own molars used to be, and with both feet lifted the big cuspidor to a target spot and made a trial shot.

"Wonder what you and I would have done if the Old Man had pushed a belt at us?"

"Argued a bit—probably," Old Tom chuckled.

Toby scored a direct hit.

"We sure could do that."

"But gee, Toby!" Old Tom shook his head perplexedly. "We never argued like they do now—at lunch."

"What about?"

"Anything! Everything!" The foreman flung both arms wide. "United Nations! Last war! Next war! This noon the sales manager makes too much money!"

"Duvall? Wha'd you say?"

"Wouldn't I go over big trying to tell 'em fifty grand is juke feed?"

"But, Tom, there have to be answers!"

"OK. Come down any noon and make some. However—I'll bite. What *is* the answer? If you know."

Hunched forward, Toby worried the cud. Then:

"That man on the belt. Working on T-X's. What does he think's going to become of them after he's worked on 'em?"

"Dunno," Old Tom boomed. "Probably thinks the Old Man eats 'em to cure his ulcers."

"Don't be an ass!" Toby snapped. "Every morning he knows that belt'll start. T-X's will come—and go. But where? We can't pile 'em up. Do that and all the belts stop. Tom—Duvall makes belt room. And this too-much-money mostly means I-ought-to-get-some-of-it. But, if we gave a raise of fifty grand to a thousand men, what would each one get?"

Old Tom scratched his head. "Buck a week."

Toby's lids half closed. "Ninety-six cents. Pack of cigarettes a day. Tom—when Duvall came to us we were far down the field. He ran us up to second place. We're still climbing. Most of those jobs out there in the shop were made by Duvall.

"So—what do we do? Cut him and have him go sour? Or replace him with some worse guy for less, have sales fall off, jobs be fewer, and worse, and five years from now find we made a big mistake and try to get out of the hole—with another Duvall—if we could find one?

"Every salaried man is paid for what he contributes to the company's success. Take away our good brass and this plant wouldn't last long. That man on the belt," Toby pointed, "is paying Duvall 19 cents a day insurance for the continuation of his job. You know, Tom," Toby slid off the desk, "we all have to pay—something—for what we get."

"Except—" the old foreman lifted a massive finger, —"chewing tobacco." And ducked the parting swing of his one-time shop mate.

You don't figure on your plant burning down. Neither did the executives of Charles D. Briddell, Inc., Crisfield, Md. But their plant did burn down. Here's their story:

FROM DESTRUCTION TO PRODUCTION—IN 38 DAYS

Briddell executives hope you don't need a fire to learn the lessons they learned. Their story is full of ideas you can use now to avoid trouble. And if you *do* get in trouble, here's how to dig yourself out—and get rolling again in a hurry.

FIRE GUTTED PLANT of Charles D. Briddell, Inc., cutlery manufacturers of Crisfield, Md., in the early hours of March 3. Although the building was not sprinklered, it had the normal complement of fire-fighting equipment. And housekeeping was first-class. A series of almost unbelievably bad breaks helped the fire along; made things much worse.

ON MARCH 3, 1951, the plant of Charles D. Briddell, Inc., was destroyed by fire. Only 20% of the machines could be salvaged. Practically all raw materials and finished goods were destroyed. The company lost irreplaceable records, blueprints, lists of suppliers, specifications. Yet, just 38 days later, production started again. Only two months after the fire, the first shipments of cutlery left Crisfield. And, sometime this month, the backlog of orders for steak knives—Briddell's most important product—will be the same as it was before the fire.

The fire started at 3 a.m. in a finished-goods

AN ABANDONED BOTTLING WORKS became the shipping and receiving department. Production of steak knives began just 38 days after the fire, and first shipments were sent out only a month later. In spite of this downtime, Briddell has caught up on production of steak knives (its major product). It now has just as big a backlog of orders as it had before the fire. Rest of cutlery line is close behind.

ONLY A SHELL WAS LEFT next morning. Photograph shows guard keeping the curious away from the still-smoking area. The fire threw 275 employees out of work—in a small town where there is little other employment. And record sales the previous month ($263,000) had left the Briddell company holding the biggest backlog of orders in its history.

HIGH WIND CUT RAZING BILL a few nights later. Quick scorecard on loss: punchpresses, 100% destroyed; grinding and polishing machines (many custom-built), 90% gone; one-third of the tempering furnaces beyond repair; assembly equipment, nothing left. Almost all of the company's dies, records, specifications, and blueprints went up in smoke.

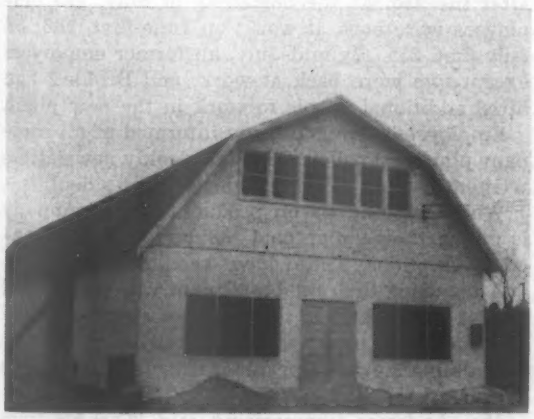
storage area, which was locked. The first man to reach the scene couldn't get in. By the time he'd found the night watchman, the fire was out of control. The watchman had passed within 10 feet of the spot, and punched his time clock, only 10 minutes before. Fire companies from Crisfield and near-by communities responded in record time. But they could do nothing.

Briddell had an auxiliary pump with hoses leading to the near-by bay. But on that night the tide was unusually low, and the hoses didn't reach the water. One of the town pumps was connected to the same power line as the Briddell plant. When the line was cut, pressure dropped.

The company had long feared that a fire in the row of adjacent frame houses might spread to the plant. So they bought the house at the end of the row nearest the plant, "at a fabulous price," and tore it down as a fire break. Said Willis Briddell after the fire:

"We were right! The fire didn't jump the break. We just figured the direction wrong."

By six o'clock that morning, when the fire was out, the damage had exceeded $500,000.



A GARAGE, two miles from town, was picked by the assembly foreman to set up shop in. Like other foremen, he was put in complete charge of getting his department into operation. Foremen made most decisions on their own—for machine salvage, remodeling makeshift facilities, getting plant services in. This was a big factor in Briddell's recovery. Its training of foremen as managers really paid off.

QUONSET HUT right next to the burned plant was chosen for plating and grinding. Two carloads of machines for this and other departments were located in suppliers' stocks, scheduled for shipment to Briddell, by two o'clock on the afternoon of the fire. Quick delivery on many other machines was possible through cooperation of other companies, who let Briddell have machines they had on order.

More on next page

What Briddell Did to Get Into Production

BOARD OF DIRECTORS MET • At eight o'clock the same morning, the 5-man board of directors met to decide what to do. It didn't take them long. They decided to get back into production as quickly as they could, however they could. Before they met with their employees at two that Saturday afternoon, they had made these decisions:

1. They'd stay in Crisfield, in spite of its "dead end" location on Maryland's Eastern Shore.
2. Until they could get a new plant built, they'd set up shop in whatever buildings were available. And they'd start now to line up those buildings.
3. They'd made a tentative decision to locate the new plant on the outskirts of town.
4. They'd made up lists of the people who were to report for work on Monday to start taking inventory and begin the salvage job.
5. And Charles Briddell, president, Willis Briddell, financial vice president, and Reese Betts the works manager, were made a "committee of three" to start getting together the machines, equipment, and supplies they needed.

TOLD EMPLOYEES THEIR PLANS • All Briddell employees attended the meeting held that afternoon in the local theater. Company officials told employees of the decisions they'd made. They promised to keep them all fully informed of developments. They set a goal of 45 days for getting back into production. And they offered to help any employee with personal problems.

DIVVIED UP RESPONSIBILITIES • Within a few days after the fire, the senior executive board divided the total responsibility for getting back into production.

Evelyn Briddell Andrews, director of personnel and purchasing, stayed with the greatly magnified problems of employee relations and procurement.

Charles Briddell, company president, took on the job of getting the machinery needed.

Reese Betts, works manager, was responsible for setting up temporary manufacturing facilities and getting production started as soon as possible.

Willis Briddell, financial vice president, was put in charge of handling the insurance claims and planning construction of a new plant.

PERSONNEL DIRECTOR'S RESPONSIBILITIES

"Our first job was to make sure our 275 employees were taken care of," said Mrs. Andrews. "Crisfield is a small place. Other jobs are hard to come by. About 60% of our people own or are buying their own homes. They have mortgages to meet."

The first thing Briddell executives did, at the March 3 meeting, was to offer help of any kind to any employee. Specifically, by early in the week after the fire, they'd established special financial emergency loans, up to $100. These were to be repaid at the worker's convenience, after he'd been brought back to work. Every employee was called, and in some cases visited, to ask if he had any special problems.

Over 95% of the employees had joined the company's optional sickness and benefit insurance plan, and the Blue Cross. These insurance companies were asked to extend the 30-day lapse clauses, to cover employees not back at work.

Most personnel records were destroyed. The personnel department sent out a blank form to each employee, and asked him to fill it out as best he could. Briddell wrote to the insurance companies (accident, sickness and benefit, Blue Cross), and got duplicate records. Not all payroll records were lost, but the sections showing pay rates were. The foremen did the best they could to reproduce these records; in many cases the employee's word was accepted.

More than 100 people were called back the week after the fire. At the beginning of May, 162 employees were back at work; on June first, 206; on July first, 235. By mid-July, all former employees except two were back at work, and Briddell had hired additional people to work in the new plant.

Employees were kept fully informed of all company plans and policies through weekly newsletters written by Tom Briddell, sales vice president.

While catching up on production, the company is giving the regular paid holidays, but has canceled vacations. There have been no complaints.

A traveling first aid department was established to care for workers in the scattered shops. A nurse drives around town, covering each shop at least once daily. She cares for minor injuries, replenishes the shops' first aid supplies.

Mrs. Andrews, summarizing, said, "Our program of helping employees at every opportunity, but without paternalism, seems to be the best thing we could have done. Everyone has an inspired feeling to do the job. We've had no gripes at all—and that includes men working in a quonset hut 10 hours a day last summer over grinding machines, with the outside temperature at 110 degrees."

PRESIDENT'S RESPONSIBILITIES

"Replacing the machines we lost was our toughest problem," said Charles Briddell, company president. That's the job he took on. The machines destroyed were carried on the books at $80,000. Charles has spent $125,000 so far, has replaced with duplicate or similiar machines 90% of those lost. His first move was to contact his regular suppliers of machinery; to place orders and see if any machines were available from stock. Two carloads that were immediately available were shipped to Briddell the next week.

Biggest break on machinery came the week after the fire. The Personna Blade Company of Holyoke, Mass., had just shut down its cutlery department. Charles was invited to come and get what he could use. He bought $30,000 worth of special cutlery tools and machine tools for rebuilding Briddell's own salvageable equipment. It might have taken eight months to get them on the open market.

Hollow-grinding and mirror-finishing machines were a special problem. They are made by only one manufacturer. He had a few units completed, ready for shipment to another customer. The customer agreed to let Briddell have them.

The manufacturer also had an experimental model and several obsolete models. Charles bought them. He had enough machines on hand by mid-April for the grinding and finishing departments.

The same manufacturer also took on extra people and paid them overtime rates on other machines Charles ordered. The bill: about $70,000.

The rest of the machines, mostly general-purpose machine tools, were purchased wherever they could be found. Charles used the company plane—a 4-place Cessna monoplane purchased two years ago—traveled all over the country on his "hunting trips."

Said Willis Briddell, "The quick delivery we got is one of the best plugs for free enterprise I've ever heard of. All our suppliers bent over backwards to help us."

But it wasn't all as easy as it sounds. Some machines just couldn't be replaced on short notice. A custom-built surface grinder, used in carving knife production, wouldn't be available for 18 months. Briddell maintenance men have rebuilt their damaged one almost from the ground up.

Punchpresses were still not available at the time production was to start. So the foreman of that department took his dies to a Philadelphia subcontractor until Briddell's presses were repaired.

"Nowhere," said Charles, "did I pay anything but the fair value for machines. Everyone knew we had to get the equipment fast, but there were no premium payments."

WORKS MANAGER'S RESPONSIBILITIES

"Getting back in production in 38 days is a record we're all proud of," said Reese Betts, works manager. "We'd never have succeeded if every employee hadn't gone all-out to help."

The nine locations in Crisfield where production was to be set up were selected within two days of the fire. Inventory reports were also available by that time. Each foreman was called in for a consultation on rebuilding his department. With the company president and works manager, he decided what facilities would be repaired by Briddell's own men, made up lists of tools and equipment that had to be purchased.

At this point, except for daily progress reports to the works manager, the foremen were turned loose to do the quickest and best job possible.

Each foreman was assigned skilled maintenance men to start salvage operations, the number of men depending on the "priority" of his department. The punchpress department (first in the production flow) was given top priority. Fewer men were assigned to assembly, because it didn't have to be ready for production until a month after the other departments had resumed operation.

Biggest problem in rebuilding was lack of machine tools. Until Charles Briddell found some, maintenance men worked around the clock with the two that were not destroyed, and with any spare machine tools available in other shops.

Actual production started in the last week in March. Departments were reopened a week apart, so that each had a backlog of one week's production to work on. By the end of April several hundred thousand knives were in production, and other items in the line were added as tools and equipment became available. By July all items were back in production.

All departments, when reopened, started in full production, with no shutdowns after that. That meant employees collected unemployment insurance up to the day they started work on full schedule.

Main problem still plaguing production: loss of blueprints, specifications, and cost records. The company has been able to reproduce specifications and job costs of common items from the memory of foremen and accountants, but it's stuck on the not-so-common items.

Proof of the success of the rebuilding job: It costs less today to produce a steak knife than it did before the fire. Company officials had known improvements that could be made to reduce costs, and since they were starting virtually from scratch after the fire, it was a good time to make them.

More on next page

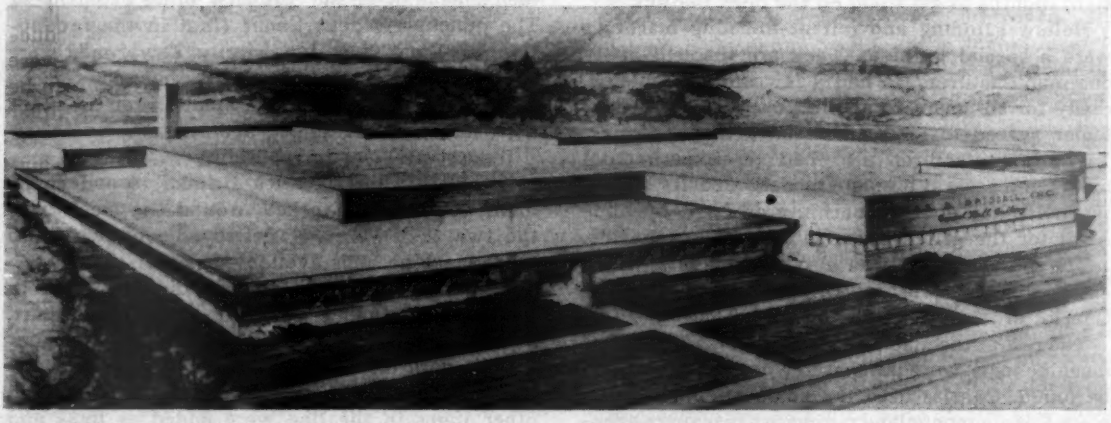
PURCHASING AGENT'S RESPONSIBILITIES

"Within two days of the fire, almost every supplier had phoned or wired, 'What can we do to help? What do you need?'" said Mrs. Andrews. "Even though more than 60% of our raw materials were destroyed and we didn't have a hammer or wrench or screwdriver, we were not held up a single day for lack of materials or supplies." All suppliers of raw materials—cutlery steel, plastic handles, zinc, copper, etc.—were asked, and agreed, to keep orders standing. Because there was no storage space available in Crisfield right after the fire, all suppliers kept materials in storage at their plants until mid-April.

Much of the responsibility for purchasing tools and other mill supplies was placed on the mill supply salesmen. Reese Betts and the foremen sat down and "scratched their heads," made up lists of supplies needed. These lists were given only a quick check by Mrs. Andrews, who then forwarded them to the mill supply houses, asked them (in most cases) to select the best tool or piece of equipment for their needs.

The help offered by suppliers took many forms. A supply of chrome-vanadium steel (worth $25,000) was not destroyed by fire, but Briddell didn't have proper storage facilities. The steel was beginning to rust. A Bethlehem Steel metallurgist, who visited the plant shortly after the fire, had the steel (only part of it bought from Bethlehem) sent to his plant, where it was re-pickled, oiled, and returned.

Michigan Moulded Plastics Company, supplier of Briddell's knife handles, assigned men to search in the Michigan area for supplies Briddell needed;



NEW PLANT WILL LOOK LIKE THIS by February, if schedules are met. Combination of design, materials ("less wood than you can hold in one hand"), sprinkler system, rural location, got Briddell an insurance rate that's only 3% of the rate on the old plant. Distance to work is about the same for most employees.

FINANCIAL VP'S RESPONSIBILITIES

"Our new plant is coming along fine. We hope to be in by February," said Willis Briddell. The new plant is his responsibility.

First consideration was: Rebuild on the old site or out in the country? In spite of the added cost of starting from scratch (they could have used the old foundation, city water supply), Briddell executives decided to move to the outskirts of town because: (1) They wanted room for one-story construction, future expansion, and parking areas; (2) they wanted to be on the main highway, have a rail siding; (3) a rural location meant lower insurance rates, a much lower tax bill.

By the time the architect (The Ballinger Company of Philadelphia) was selected, the president, works manager, Willis Briddell, and the foremen had made department layouts. So complete was the company report on size of departments, services required, layouts, etc., that Ballinger's first revision of the drawings for the new plant was the only one.

The Crisfield area has a lot of good sub-contractors (plumbers, masons, etc.). So Briddell took on the general contracting job, started the foundation even before blueprints for the new plants were complete.

First orders for steel and other building mate-

much of what they uncovered was flown to Crisfield in the plastics company's private plane.

Employees of the same company met in special committee two days after the fire, offered to lend Briddell several thousand dollars from their association treasury.

In purchasing some of the supplies needed, the company came up against the added costs of having to buy in a hurry. Company officials have lost track of the tremendous bills for telephone and telegraph service, air express and parcel post special delivery shipping costs, the traveling costs incurred in combing the country for "impossible to get" items.

And Briddell had to buy at retail many items they would normally have bought wholesale. Micrometers, calipers, dial gages, and speed indicators were in such short supply that the manufacturers had few on hand. Reese Betts, works manager, found out who the manufacturers' distributors were, who the retailers were, and followed "down the line" until he found the items needed.

A 30-ACRE PLOT OUTSIDE TOWN was selected for new plant. Estimated annual savings in insurance, taxes, and water, because of rural location: $15,000.

rials were sent within a week after the fire, before the company had more than a general idea of what the new plant would be like. Its priority rating (DO-46) for building materials was received about three weeks after the fire. To date, Briddell has had no trouble getting steel. But the new plant *has* been held up by extended deliveries on bricks, tile, roofing materials, copper, and other materials for electrical distribution.

Said Willis: "The new plant will eliminate the 'topsy' set-up we've worked under for so long. We've shaken off inefficient, traditional methods. We have better layout, better flow of materials, better everything. Lower unit costs may yet convert disaster into dollars."

Briddell executives list

THE LESSONS THEY LEARNED

Part of this list is mistakes they'll never make again. But it includes the things they're particularly glad they did think of before the fire. You might make it a checklist for your plant now—just in case . . .

1. Keep operating records in a fireproof safe. We lost all our production control and scheduling records, blueprints, specifications, lists of suppliers, production cost records, purchasing records, payroll and personnel records. Some of these are irreplaceable, the rest immensely difficult to replace.

2. Have a periodic appraisal made—by an outside appraiser. Someone familiar with the plant can walk right by a set of $200 wrenches and never see them. We'd had an appraisal made just before the fire, but the report wasn't in. When it did arrive, we found we had 75% more value than we'd thought. So of course we hadn't insured heavily enough. If nothing else, our appraisal was invaluable in settling insurance claims.

3. Don't spread insurance among too many companies. We had bought insurance from seven companies, had 30 separate policies covering the buildings and equipment destroyed. The confusion in settling claims was tremendous. All insurance on our new plant will be written by one company.

4. Check your fire precautions once again. Remember we had a pump, and the tide was too low to get water. One of the town pumps was tied to our power line, and wasn't much help after the line was cut. We had only one locked area in the plant, but that's where the fire started. Don't overlook a possibility.

5. Make sure your fire-protection people are well trained. We're going to use only young and active men for guards in the future. And they'll have few, if any, additional duties.

6. Have your foremen ready to take over heavy responsibilities. If they're properly trained and really management-minded, they're an invaluable asset in time of disaster. We'd long believed that including foremen in our monthly "Junior Management Panel," teaching them management problems, and carefully convincing them that they were part of management, was sound practice. It certainly turned out to be. If we hadn't been able to turn over to them much of the responsibility for rebuilding, we might not be in production yet.

PRODUCTION FOREMAN loads casting chips into automatic tube carrier. He's sending sample to . . .

LAB ANALYST for a check on casting quality. Speedy OK via air tube will free castings for machining.

Speedy processing of production orders and fast spot checks on product quality are paying off for Bridgeport Brass Company in lower costs, better customer service. The company is reaping these profitable returns by moving (1) vital paperwork, and (2) metallurgical test samples through its . . .

New Automatic Air Tubes

ASK SALES AND PRODUCTION PEOPLE at Bridgeport Brass why their teamwork has improved of late, and they'll point to the plant's new pneumatic tube system. It has been in operation only two months, but is already paying its way . . .

. . . by speeding the flow of paperwork between sales and production departments.

. . . by moving metallurgical samples rapidly from production centers to testing labs.

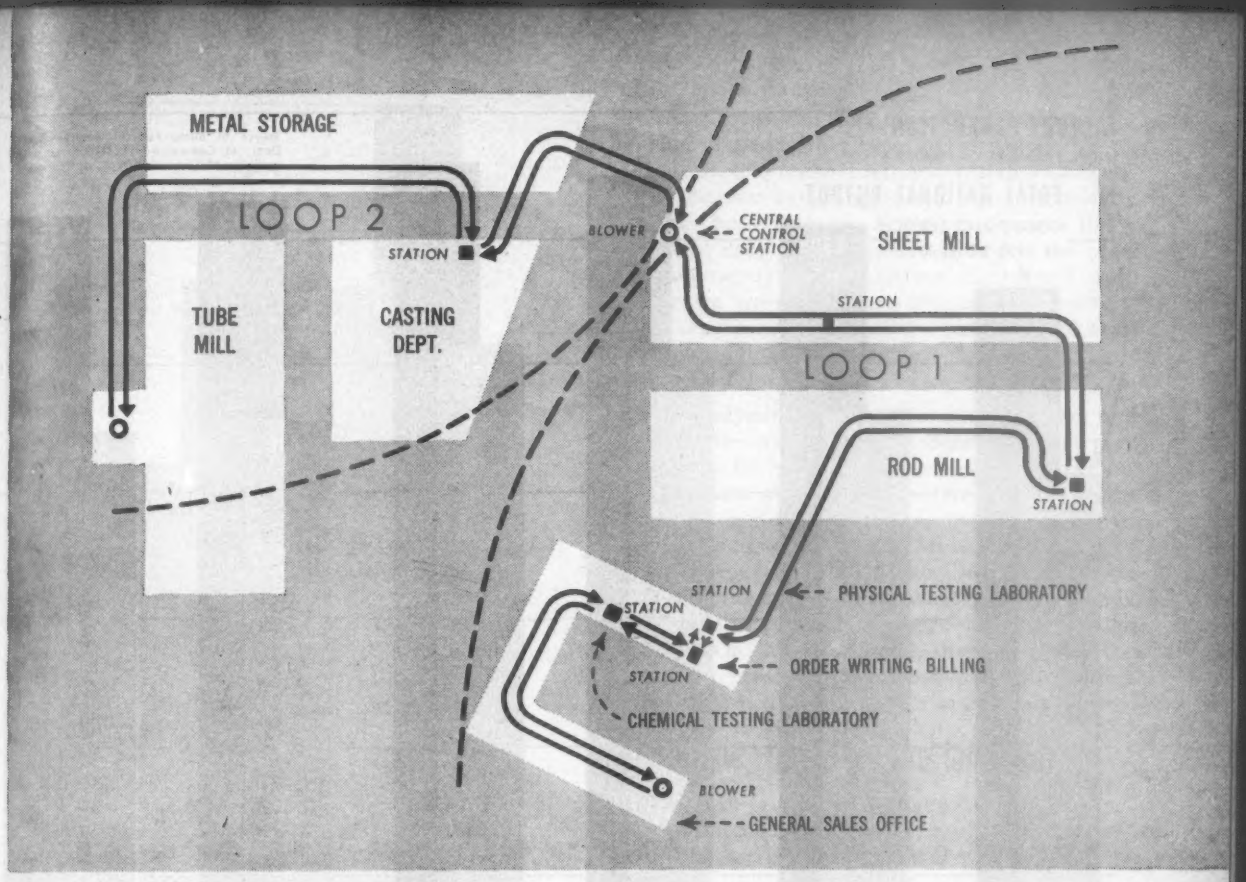
This is no ordinary air tube system. It's fully automatic. It operates pretty much like a telephone exchange. You can transmit from one station directly to any other station in the system simply by dialing the proper number. The unit was installed by Airmatic Systems, Inc., New York. It's the first of its kind in the U.S.

HOW IT WORKS • Every carrier has two dial bands —each numbered from 0 to 9. The sender dials the station he wants. The carrier is shot off to a central control station where electric contacts "read" the dialed number. Automatic relays at the central station direct the carrier to its destination without rehandling.

Stations in the BB system are laid out in loops or branch lines. You can have up to 10 stations on a loop. Each loop has only two tubes—one for sending, the other for receiving. A conventional tube system would have separate pairs of sending and receiving tubes between all stations in direct communication. Since its loop system uses less tubing, BB cut installation costs, used little valuable floor space.

The company now has nine stations spread out over two loops. It could have put all nine on one loop. But that additional loop will permit easy expansion. Eleven more stations can be added simply by breaking into existing lines. The company has routed its two loops through departments that it may want to add to the system in the future.

At present 4000 feet of tubing ties five buildings into the network. Stations are located on all levels of the plant—from basement to third floor. A carrier can travel from one end of the system to the other in about two minutes. The cylinder cham-



TWO-LOOP AUTOMATIC AIR TUBE ties together wide spread operations at Bridgeport Brass plant. Over 500 messages—production orders, schedules, and test samples—are dialed through the system each day.

ber—13½ inches long by 2½ inches in diameter—holds a sizable payload of messages or samples.

WHY BB INSTALLED THE SYSTEM • Brass mill products are ordered in a variety of sizes, shapes, compositions, and hardnesses. Seldom are two customers' orders alike. This means the routing of a lot of paperwork through the plant. And a step-by-step check on product during production.

To make things tougher, the plant is spread out over a large area. There are four production buildings—rod, sheet, and tube mills, and a casting shop. The main office is in a fifth building. Orders, schedules, and production samples used to move in and out of the main office building by messenger service. A message might take an hour—or even longer—to reach its destination. Now it's delivered in a matter of minutes.

RESULTS • Orders handling—from the time a purchase order hits the sales department until it is ready for billing—is now a pneumatic tube function. Production orders, schedules, other vital papers flow smoothly and rapidly from the sales department to order writing to production to the billing departments.

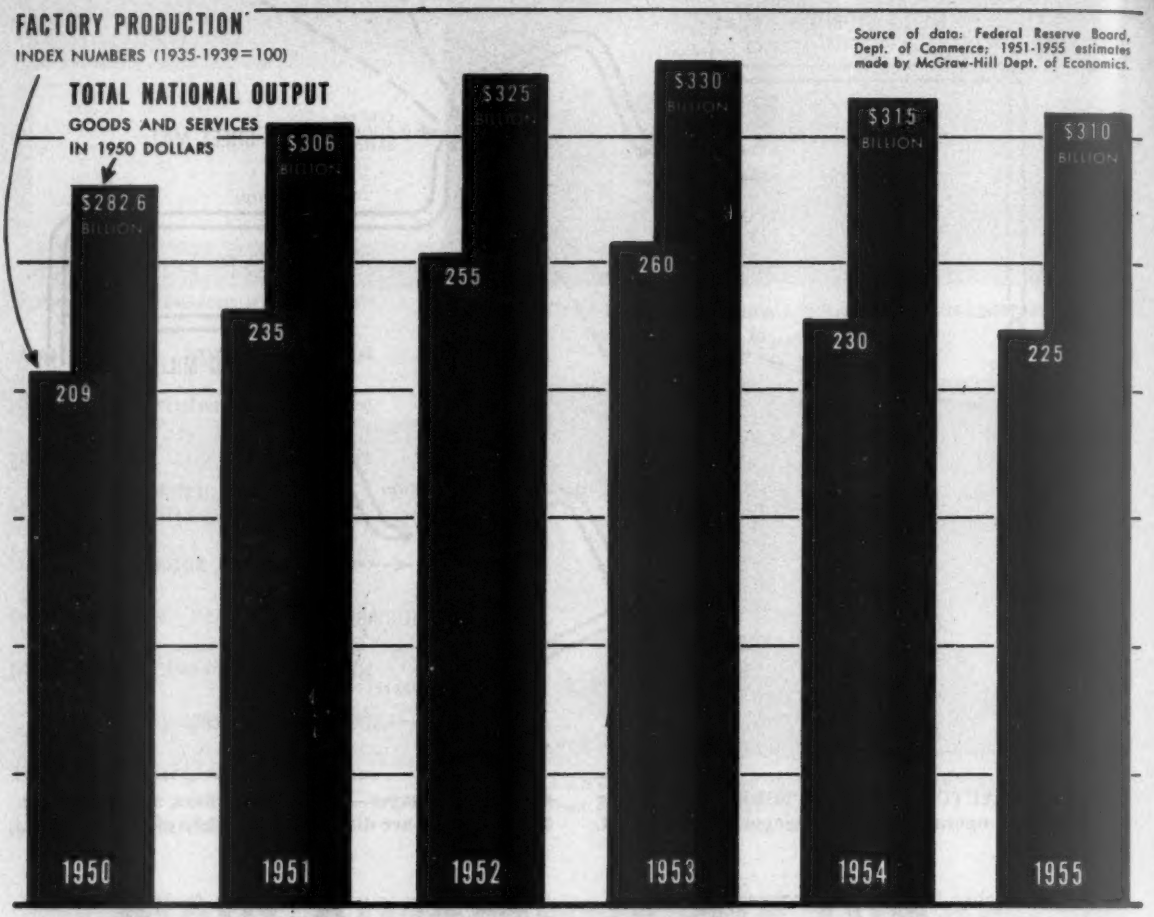
Automatic air tube service means faster spot checks on product quality, too. When the production operation is completed, the foreman rushes a sample off to the testing labs. As soon as the analysis is made, the report is back to production in nothing flat.

Speed here means quicker shipment of finished orders. Also faster flow of material from one production operation to another. There's no unnecessary tie-up of equipment and work in process.

But efficiency may not be the only advantage of an automatic system. Company officials aren't talking cost figures yet. The installation is too new. But they indicate that the system is rapidly paying for itself by releasing a sizable number of experienced employees for productive jobs. Operating costs are low. There's no need for a full-time operator or dispatcher. Just someone to turn the system on in the morning and shut it off at night.

Bridgeport Brass is planning to expand system coverage soon. Next in line to be cut into the network are the purchasing, receiving, and accounts payable departments.

After that may come shipping. BB has one shipping department in each production center. The plan is to tie in all four with traffic control. Then for every shipment, traffic can quickly prepare labels, bills of lading, and other shipping documents from its customer file of master plates. And shoot them by tube to the loading platform.



SHORT-TERM PICTURE **A mild readjustment period will follow the end of the mobilization boom. There's likely to be more competition, more price cutting, and more product changes than there were in 1946 and 1949. But there's no depression in the cards.**

The Business Outlook, Now to 1960

By ROBERT P. ULIN • McGraw-Hill Department of Economics

● The average manufacturer must plan on a 35% production increase over the next 10 years—or risk losing his competitive position.

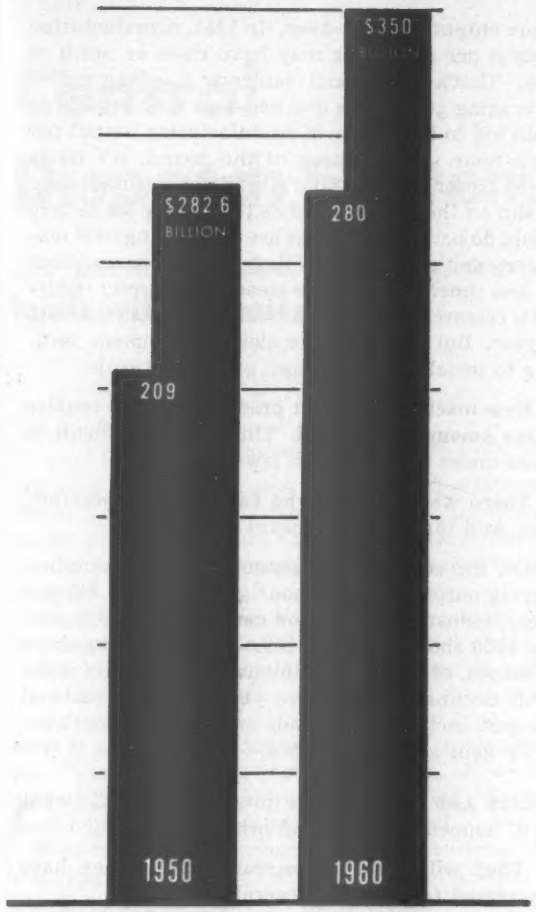
● That's the challenge that emerges sharp and clear from a timely analysis of business activity made for FACTORY by the McGraw-Hill Department of Economics.

● The forecasts on which this and other conclusions are based, are, to be sure, only forecasts. They can't be exact. But they don't have to be. What you need, in your own planning, are the general dimensions of any likely changes in business actiivty.

First, the short-term prospect

RIGHT NOW, if you're planning a manufacturing program, you have to do some thinking about the business cycle. In 1950 and 1951 we have piled a defense production boom on top of a first-class civilian boom. And we're evidently headed still higher next year. The defense program won't reach its peak before late 1952 or 1953. By then, industrial production, both in dollar value and in physical units, will top the highest level reached during World War II.

But what will happen when defense spending



LONG-TERM PICTURE **By 1960, population will be bigger, living standards higher. Production will have to increase.**

begins to decline? Will the reduction in arms output—as well as lower military requirements for production tools, and for raw materials like steel and aluminum—cause widespread unemployment and a severe business recession?

As things stand now, a severe drop seems unlikely. The arms program is slated to remain at a relatively high level for several years after the peak of mobilization has passed. And there should be enough deferred demand for civilian products to offset a moderate drop in defense spending.

Obviously there won't be as much pent-up demand for automobiles, refrigerators, or factory equipment as there was after World War II. That's because people will be able to get reasonable amounts of these things during the current emergency. But you can still bet on a fair-sized boom in consumer durables when restrictions are off. At the high income levels that are expected, there will be more potential customers than before Korea. And there will also be a strong demand for new housing and other types of construction.

These factors make a business collapse unlikely, unless defense spending is cut more drastically than has been planned. What seems more likely is a slight decline in business activity as the arms program tapers off. Munitions plants will drop their extra workers. There will be less overtime pay. That means some decline—probably less than 10%—in industrial production and in workers' incomes.

In a readjustment like this, with business and consumer incomes dipping moderately, there may be quite a lot of pressure on manufacturers for new products and for competitive pricing. That's what happened in 1949, and again early this year, when selling got a little tougher.

But, except for a relatively few companies selling directly to the munitions industries, there probably won't be the problem of large-scale production cutbacks. On the other hand, there won't be the immediate pressure to expand production there was after World War II—even in consumer goods.

Now, then, for the long pull

Let's look 10 years ahead. That's the minimum period you should consider when you plan your manufacturing set-up. How big will your markets be by 1960?

No one can tell just where we'll be in the business cycle at that time. But let's assume that 1960, or some year close to it, is a normal one.

In the McGraw-Hill Department of Economics we have prepared the following estimates of growth in the national economy from 1950 to 1960:

Population: will reach 170-million, up 12%.

Consumer expenditures: $240-billion, up 25%.

National output of goods and services: 350-billion, up almost 25%.

Factory production, as measured by the Federal Reserve index: up about 35%.

Factory employment: 15.9-million, up 7%.

The above estimates are for a prosperous year around 1960, assuming no war in the meantime. All estimates are in 1950 prices, which do not reflect possible inflation.

These estimates are indicators of over-all growth. Individual industries may grow at rates above or below the average. In fact, as we will show in an article in the next issue, several manufacturing industries may double their 1950 output within the next 10 years. These "growth" industries stand out, of course. But it is equally significant that the *average* industrial company must plan on a 35% production increase over the next 10 years or risk losing its competitive position.

GROWTH FACTORS · What are the key forces making for growth in the economy?

The first is population growth. An increasing

population creates demand for an increasing flow of goods and services. And, in recent years, population has consistently run ahead of the official estimates.

It seems clear that higher incomes and more economic security have led people to get married earlier and have bigger families than they used to. No one can tell how long this trend will continue. But it seems reasonable to assume a high rate of marriages and births for the years ahead.

Our population is not only growing. It is also growing up. The record number of children born during and just after World War II are now of school age. And, as they grow older, their wants and needs will increase.

The number of people of working age isn't growing so fast. It's limited by the low birth rates of the 1930's. But the number of older persons is increasing rapidly because of advances in medicine.

This changing population will require more new products than a static population. And, as indicated, the requirements will fall on a relatively smaller labor force.

Also, the population is moving about—from cities to suburbs, from the North and East to the South and West, from apartments to homes. And these population shifts mean shifts in consumer markets, as well as a continuing strong demand for new construction and everything that goes into it.

A second factor in economic expansion is the steady increase in living standards. This is particularly true of the lower and middle income groups. The post-war distribution of income, with more than 20-million families earning more than $3000 a year, has opened up new markets for goods that many of them once considered luxuries.

That includes automobiles, household goods, apparel, and many food products. And, as working-class incomes increase further, there is every reason to believe people will want more and more of these things.

A third factor is the increasing predominance of the United States in the defense and economic development of the rest of the free world. The federal government alone will soon be spending over $7-billion a year on foreign aid programs. And our interests abroad are more likely to grow than to diminish. To meet our growing commitments, more and more goods must flow abroad.

GROWTH PROBLEMS · It's not going to be easy turning out enough goods for this expanding, restless population—and the rest of the world as well.

One big problem will be getting enough workers. The labor force is growing slowly. And the trend is to earlier retirement and a shorter work week. But we probably can get enough workers, particularly by using more women workers, to do the job —if we also increase efficiency at a rapid rate.

That means we must get higher productivity—more output per man-hour. In 1950, manufacturing output per man-hour may have risen as much as 8%. That's exceptional, but over the long pull—averaging good years and bad—we may be able to gain 3% to 5% a year in manufacturing output per man-hour. On the basis of the record, it's likely to be closer to 3%. That's the long-term average.

But on the basis of today's technology we clearly could do better. Engineers are discovering new machines and new methods that turn out more goods in less time. So, with the steady increase in industrial research programs, productivity could gain 5% a year. But that will take alert management, willing to install new machines on a large scale.

New machines to boost productivity also require large amounts of capital. This may be difficult to raise under prevailing tax laws.

There would have to be full labor cooperation, too. And that is by no means guaranteed.

On the conservative assumption that manufacturing output per man-hour gains close to 3% per year, industrial production can make the 35% gain by 1960 shown on page 109. (There will be more workers, of course, but the average hours of work will decline during these years.) Total national output, including the trade and service industries, may gain as much as 25%.

COSTS AND PRICES · As production rises, what will happen to costs—and prices?

They will probably increase just as they have increased for the past several years.

The reason is simple. Wages are sure to keep rising. If they rise more than output per man-hour—as they probably will—we'll have a steady upward trend in industrial costs and prices.

Since World War II, union labor has consistently been able to win large annual wage increases. This habit seems pretty well fixed. More and more companies have accepted the idea. They have even written it into contracts as an "improvement factor." The unions' bargaining power is being steadily reinforced with political power, which will count heavily in labor crises.

How much will factory wages rise in future bargaining rounds? Including fringe benefits, it could easily be 4% or 5% a year, and more for the leading companies. If productivity gains that much, the increased wage bill will be offset. But if—as seems more likely—the annual gain in output per man-hour averages only 3%, we are in for some significant inflation during the next decade.

WHAT INDUSTRIES will grow fastest in this decade of high production—and high labor costs? See November's issue.

Central Dispatch System

. . . permits three times as many loads with no extra trucks

By HERVE A. J. LESSARD
Supervisor of Intra-Plant Materials Movement
Pratt & Whitney Aircraft Division
United Aircraft Corporation, East Hartford, Conn.

WE HAVE 13 fork lift trucks and 9 low-lift platform trucks for in-plant materials handling. Those 22 trucks move over 800 loads a day. That's three times the number of loads the same 22 trucks moved back in 1948.

How did we get that kind of increase with no extra equipment or men? A central dispatch system —that cost less to install than the price of one additional fork lift truck.

HOW IT ALL BEGAN · Back in 1948, 17 of our trucks were assigned to specific departments; 5 were "rovers." The trucks were always behind. There were big backlogs of material to be moved.

We evaluated the performance of the truckers. It was clear that the rovers were far more productive. Our first thought was: Why not make all the trucks rovers? It could be done if we had some way to control their movements. And the answer to that problem came quickly: a special telephone system, or central dispatch system.

HOW WE SET UP THE SYSTEM · The system was designed jointly by the telephone company and our engineers. It consists of a central switchboard, and 21 call stations at key points in the plant—about 300 feet apart. Call stations are located on the aisles and are high on the wall, so the driver doesn't have to get off his truck to use the 'phone. And there are blue lights at each station that can be lit by the dispatcher when he wants to reach a driver.

We insured the co-operation of all concerned by asking the drivers and certain key people to recommend best locations for the call stations. It is interesting to note that they were unanimous on 19 of the 21 locations we adopted.

HOW THE SYSTEM WORKS · At the start of a shift, all trucks fan out through the plant. Then the dispatcher takes over, and all truckers must keep in contact with him. They are free to pick up any material in "outgoing" areas, provided they inform the dispatcher. This avoids duplication.

NERVE CENTER of central dispatch system—telephone switchboard and key map of plant. Each peg on map locates a specific truck. Slips on clipboard are requests for truck service.

AT ONE OF 21 CALL STATIONS in the plant, trucker receives instructions for next job. Telephone is on wall, so he can answer without getting off truck. Blue light next to 'phone was lit to call him.

Meanwhile, requests for trucking service are coming in by telephone. Two clerks write up job tickets and hand them to the dispatcher. He sorts them by area and type of truck required. He then lights the blue light at the call station nearest the load to be picked up. The first free driver who sees the light picks up the 'phone and gets his instructions "on the run."

To keep track of the trucks, the dispatcher moves pegs on a map of the plant whenever he assigns jobs or truckers advise him that they have picked up a load. The pegs are numbered and colored to represent specific trucks.

Each driver keeps a record of jobs by a brief entry on a pad: "from," "to," and "size of load." This report is helpful in tracing the inevitable misplaced or misdirected load.

The truckers handle an average of 400 request loads a day, and as many or more routine pickups. They're always busy. Typically there are 20 to 25 loads waiting. But important loads are moved quickly, and bottlenecks are broken up in a hurry. The system is flexible. But even with the flexibility, the system is always under control.

Scooters—for Sudden Service

Here's a case study from a big plant. But the idea can be adapted profitably for use in not-so-big plants.

ELECTRICAL DEPARTMENT SCOOTER at Kodak Park gets telephone serviceman on the job in a hurry. Its speed is matched by . . .

. . . TRAP-SERVICE SCOOTER that rushes service to any one of the 18,000 steam traps scattered over Kodak Park's 400 acres.

THREE SCOOTERS are speeding up steam trap replacement and repair at Eastman Kodak Company's Kodak Park plant. And a fourth scooter gets there in a hurry when something goes wrong with telephones and related equipment.

Kodak Park covers about 400 acres. It stretches out some 2¼ miles from east to west. It has more than 18,000 steam traps. It has over 3000 telephones, numerous telescribers and teletype stations, and about 50 master fire boxes. It takes 12 technicians to service all this equipment.

So a call for service on an important telephone may mean a 2-mile trip.

A Trip on the Bus

Formerly the serviceman used the plant bus system. Now, with one of the 12 servicemen driving a scooter, calls can be handled in far less time.

The scooter carries a 3x3-ft. box with a complete set of tools and test equipment.

In the same way the three trap-service scooters speed transport and repair of steam traps. When a trap is removed for maintenance work, the condensate from the steam lines has to be temporarily diverted to sewers. Today, this loss is minimized through quick removal, repair, and return of the boxes via scooter.

Not, PLEASE, In the Name of Fairness

Our national Office of Economic Stabilization has adopted a policy of gearing wages to the cost of living. We are told that "escalator clauses," which provide that rates of pay shall be adjusted to take account of changes in the cost of living, will be generally approved.

If the adoption of this policy had been announced as a frank concession to political expediency, it would have been quite understandable. There may very well be votes, lots of them, in a policy which purports to protect the income of a large group against loss through the price inflation caused by the defense program.

A case might even have been made for a policy of approving escalator clauses on grounds of production expediency. The leaders of some three million organized workers now covered by such clauses have indicated that they would fight to the limit to keep them and thus maintain "real wages," that is, wages measured by their purchasing power. The leaders of other organized groups have indicated they would fight to get the benefit of such clauses. Denial of them might mean serious strikes.

Justified "in Fairness"

However, the policy of approving escalator clauses was not based on these relatively low grounds of expediency. It was justified on high moral grounds, on grounds of "fairness." In the words of the President's Council of Economic Advisers, "maintenance of real wages during inflation cannot in fairness be disallowed."

That proposition is false.

It would be truthful to say, "maintenance of real wages during inflation cannot in fairness be allowed."

The truth of the corrected proposition becomes evident immediately when you take a look at the basic nature of the inflationary problem created by defense mobilization.

We are devoting a large share of our national production to defense. The share is now scheduled to hit about 20% in 1952.

Since we are not able to increase our total production fast enough to meet defense needs

in addition to civilian needs, that means a cut in the supply of goods and services that is available for civilian consumption. But the money paid out for the production of defense materials is added to that which is available to buy civilian goods.

Thus, more money is put into the hands of the people to buy less goods. So prices go up. That is inflation.

If one group of people then is granted enough additional money to offset the price increases — and that is the purpose of an escalator clause — and thus can continue to buy as much as they have been buying right along, less goods will be left for other consumers who are not getting this advantage. That is palpably an unfair distribution of the sacrifices necessitated by defense mobilization. In fairness, therefore, maintenance of real wages in inflation cannot be allowed.

Organized workers were not the first, of course, to get the benefit of an automatic adjustment to take account of the increased cost of living. The farmers got theirs first. The price parity formula is, in essence, an escalator clause. The federal government underwrites increases in the prices of the things farmers sell in order to match increases in the prices of the things they buy.

Crucifying the Helpless

As matters stand, two groups are without benefit of escalator clauses. One group is composed of manufacturing firms. While they have not been nearly as successful as the misleading reports of "record-breaking profits" suggest, they have been able to look after themselves fairly well — thus far.

But one group is completely without protection. It is that numerically large but politically unorganized mass of people — many of them old and relatively helpless — who are trying to live on pensions, annuities and other fixed incomes derived from their savings. They are at the end of the line when the increased costs of inflation are passed along. They have no one to whom they can pass the buck. They are being progressively pauperized by the continuing inflation caused by progressive boosting of costs and hence prices.

With the present line-up of pressure groups in Washington, protection for the principal victims of inflation — those who have saved for a rainy day only to find inflation has blown away the roof — is obviously an extremely difficult business. But to have even temporary insulation against inflation granted to powerful groups in the name of fairness should be offensive to the nostrils of a nation that presumes to assert the moral leadership of the Western World.

The only really fair way to handle inflation is to prevent it. But once it is under way, fairness demands that the burdens be as evenly distributed as practicable.

An escalator clause — or a farm parity provision — is explicitly a device to enable the group favored by it to escape the burden of inflation. Whatever concessions we feel we must make to political pressures or production expediency, let us at least be honest enough not to invoke "fairness" as justification for so arbitrary a discrimination in the distribution of the defense burden.

McGraw-Hill Publishing Co., Inc.

HOW WE SCHEDULE

Maintenance by the Week

As told to **Carl G. Wyder**, Maintenance Editor, FACTORY, by members of the Maintenance Department at Monsanto's Plastics Division, Springfield, Mass.

If you're looking for a simple, effective way to schedule maintenance jobs, this is it. Nicest thing about it is the small amount of paperwork it takes. Also nice: There's nothing in it to stop you from adapting it to your own special needs.

A NEW PLANNING AND SCHEDULING SYSTEM is really controlling all plant maintenance at Monsanto's Springfield, Mass., plant. It regulates the work of some 250 craftsmen in this 24-hours-per-day, 7-days-per-week operation.

Wyder: "How well is it working?" That was the first question I asked Plant Engineer C. E. Knight.

Knight: "This system has increased productive time of our craftsmen about 20%. It has leveled out the work load. We're no longer busy one week and slack the next. Our maintenance downtime on continuous units used to run 125 to 175 hours a month—now it's 15 to 30 hours."

Wyder: "Lots of paperwork?"

Knight: "No, mighty little. We felt from the start that the tail mustn't wag the dog. We wanted our system to cost little if anything more than before. We aimed to set up a plan that would call for a minimum of clerical and engineering expense. We already had a dispatching clerk to take the detail off the assistant master mechanic's desk. Actually we didn't have to add a single person to the existing staff!"

Wyder: "Then obviously the system had to be superficial, hit only the high spots in planning, and provide only general controls."

Knight: "You're wrong again. Our second aim was to get flexibility of application. We knew this: The more detailed your schedule, the less likelihood there is of being able to follow through, because of emergency interruptions. We realized some jobs can be done tomorrow just as well as today. On the other hand, you do have jobs that need strict control. Our system lets us schedule with latitude or apply stringent controls."

Wyder: "Well, you can't have all these advantages for nothing. Surely somebody had to give. The new system probably piled a lot of work on supervisory shoulders."

Knight: "Sounds logical, but it isn't true. Our system actually saves more than the extra time it takes the supervisory staff to administer it. Our assistant master mechanic, Mike Wingard, spends half of his time on work assignments. He never used to take that long, but now he has to analyze the work load more thoroughly. So he's able to do a better over-all job. Our maintenance superintendent, Ted Haselton, and I spend about 2½ hours a week setting up the master work schedule. Each of our 12 area engineers needs about an hour a week to draft future work requirements."

THREE MAIN PROBLEMS · Now look at the over-all production problems Monsanto solved:

1. **Plant expansion**—which increased traveling distances of a maintenance force that lagged in relative size behind production. Also, it decreased penetration of supervisory coverage.
2. **Product expansion**—which increased the demand for maintenance and repair service of top priority over a broader field.
3. **Lower inventories**—which meant the plant had to maintain production schedules of greater variety and smaller lots to keep prompt delivery dates. This added further to the list of top-priority maintenance jobs.

THREE BASIC SOLUTIONS · These problems could be licked—Monsanto decided—only by a work planning and scheduling program that would:

1. **Provide an equitable distribution of craft labor.** In other words, make sure each part of the plant receives a fair amount of work assignment. No maintenance pets.
2. **Permit close work control to meet ever-changing demands.** Emergencies are as normal in the plastics industry as elsewhere in manufacturing. Occasionally you burn out a motor, or bend a shaft, for example, when a change in viscosity causes an unexpectedly heavy load. Sometimes production can't stop the machine when "technically" necessary—it's often cheaper to let the motor run than lose the batch. When you do get into the repair job, you have to move in—and get out—fast.
3. **Get the maximum benefit of craft supervision.** No supervisor could ever possibly cover every job in his craft efficiently. This meant distributing field supervision so that each job was the prime responsibility of one supervisor.

To see how Monsanto set up its maintenance organization, please turn the page.

MINOR REPAIR ORDER

DEPT. NO. 19 EQUIP. NO. 38
DATE 3/8/51

E6683
DESCRIPTION

SHARPEN AND SET KNIVES, 51 UNIT SCRAP CUTTER

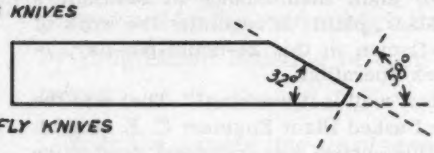
ORDERED BY WOODHOUSE

APPROVED R. W. CLARKE

JOB NO. E-6683 JOB SHARPEN AND SET KNIVES DATE ISSUED 3/12/51
EQUIP. BALL & JEWELL CUTTER BLDGS. 51 DEPT. 19 FLOOR 1
STARTING 8 A.M. 3/14/51 COMPLETION 11 P.M. 3/14/51
ENGINEER R.W. CLARKE FOREMAN J. POLI (ASSISTANT)

MILLWRIGHT	MACHINE	WELDER	RIGGER	CARPENTER	SHEET METAL	PIPE	PAINTER	AREA MECH.	OUTSIDE LABOR
✓	✓				✓	✓			

REMOVE SHEET METAL HOUSING AND ALL PIPING. REMOVE BOTH BED AND FLY KNIVES. GRIND BED KNIVES WITH 45° CUTTING ANGLE, FLY KNIVES PER SKETCH. REASSEMBLE AND SET KNIVES TO .018" CLEARANCE. AFTER FIRST BATCH OF SCRAP IS CUT, CHECK WITH WOODHOUSE, UNIT FOREMAN, FOR CHECKING AND RESETTING KNIVES



B & J. FLY KNIVES

1. Padded in sets of four, these 3x5-in. blanks control minor repairs.

2. Job card carries engineering specifications, job instructions, and "delay" or "change" data on all orders. Area engineer sends it to "person of prime

First, a firm foundation is established

ORGANIZATION · At Monsanto the production supervisor calls the shots. He is responsible for all costs in his department. He is charged for all maintenance, physical changes, repairs, or improvements. Consequently he initiates and authorizes all work done by the plant engineering department.

This work falls into two categories: (1) minor repair jobs with cost limits; (2) major repair jobs beyond such limits or *any* capital addition irrespective of cost. Minor repairs can be authorized at once. Major jobs or capital additions require cost estimates for management approval.

The plant engineering department is basically a service department. Its job is to furnish all manpower skills and utilities needed to maintain all equipment in the production departments. Theoretically the relationship to production is like that of a private contractor who must justify the value of his services while he meets every service demand. The plant engineering department also is responsible to general management for the maintenance of general plant and grounds, utilities, generation and distribution, and other services. These functions, however, don't enter into this picture.

Area engineers. The plant is divided into four major production areas or activities, each having one or more area engineers. There are now 12 area engineers. They report to Ted Haselton, the supervising maintenance superintendent. He in turn reports to Plant Engineer C. E. Knight. The area engineers have desks in the drafting room, opposite the plant engineer's office.

Each area engineer is responsible for all engineering jobs requested by the production supervisor in his area. The area engineer may recommend an improvement, but the production supervisor decides if he wants it. All orders, whether minor repairs or major projects, must flow through him. He's what you might call a local project engineer. He receives the work into the maintenance department. He engineers the job. He specifies and orders equipment or parts. And he prepares all details of the job so there will be no missing links when it is scheduled to go.

Maintenance crafts. There are 12 maintenance crafts to which the work is doled out. They are headed up by Carl Nelson, master mechanic, and his assistant, Mike Wingard, who report directly to the plant engineer. Under these two men come 11 foremen, 8 assistant foremen, and various craft bosses—for a total of 250 craftsmen.

WORK ORDER SYSTEM · It's quite simple. Minor repair jobs are controlled by 3x5-in. minor repair orders (called MRO's), as shown in Figure 1. They are numbered and padded in sets of four, with one-time carbon inserts. In the signatures in the illustration "Woodhouse" is the production supervisor, "Clarke" is the area engineer.

Flow of work orders. Woodhouse keeps one copy in his order book. Clarke sends all three remaining

JOB NO. E-6683 JOB B. & J. KNIVES DATE ISSUED 3/14/51
EQUIP _____ BLDGS. 51 DEPT. 19 FLOOR 1
STARTING WED. 8 A.M. COMPLETION _____
ENGINEER CLARKE FOREMAN POLI

MILLWRIGHT	MACHINE	WELDER	RIGGER	CARPENTER	SHEET METAL	PIPE	PAINTER	AREA MECH.	OUTSIDE LABOR
2	1				2	2			

CRAFTS NOTIFIED. PRODUCTION WILL SHUT DOWN AT 8 A.M.

J. POLI – P.P.R.

R. MARSHALL – MILLWRIGHTS

J. McNANLEY – MACHINISTS

V. SULLIVAN – TIN SHOP

W. JUDGE – PIPE SHOP

responsibility" (PPR) who is to supervise the work. Copies go to all foremen of crafts involved.

copies to the master mechanic's office. This is the control center for all incoming and outgoing work. Sometimes emergency orders are phoned here first, but the MRO number is always assigned and the confirming copies follow later. In practice, too, some MRO's of routine nature skip the area engineer. But if there's any question, he's sure to be consulted.

In its simplest application the MRO is looked over by the master mechanic or his assistant, who determines that the order is clear and material available. He keeps one copy, sends one to the accounting department for setting up costs, and sends the third to the craft foreman. All labor and material are charged to this order. When the job has been completed according to schedule (as we'll describe later), the foreman returns his copy to the control room. The office copy is removed from the work assignment files, and the completed copy sent to the tabulating department for accumulation of charges.

Major orders follow this same pattern of flow, except that they deal with project numbers. These numbers are prefixed by class numbers (1—installation, 2—dismantling, 3—repairs) assigned in the plant engineer's office after job estimates and approvals.

Philosophy of maintenance management. It's important to insert this philosophy here. In the design of an effective planning and scheduling system, you are faced with three questions on every job:

1. What? The production supervisor dictates this, as you've just seen, through the work order system.

2. How? The area engineer decides on this most of the time. Sometimes the master mechanic or his assistant decides. On big or tricky jobs the maintenance superintendent or plant engineer takes the lead. For this function Monsanto employs a "job card" form which we'll describe in a moment.

3. When? Production supervisors, area engineers, plant engineer, maintenance superintendent, master mechanic, and assistant—all have a part in deciding when. The procedures involve several routine steps yet to be described.

Note that Monsanto makes the responsibilities of people so clear-cut that, whenever any question arises about *what, how,* or *when,* you know from whom you can get decisive action to make the next move.

Use of job card. The job card shown in Figure 2, is really an engineering specification, job instruction sheet, and a "delay" or "change" order—all in one form. It supplements the original order. Its primary purpose is to clarify in the minds of the maintenance people what really is wanted. In the MRO illustrated, the production supervisor (Woodhouse) says he wants the knives on the scrap cutter sharpened and set. The job card tells the maintenance man exactly how to do it.

This job card—like most job cards—was made out by the area engineer. He works up his job cards at his desk daily as the need arises. All major jobs and a few minor repairs need job cards to describe job details, or to refer to drawing numbers, or to point out any job eccentricities such as "need a welding permit" or "get a tank permit." Should the nature of the job later require any changes whatsoever in original instructions, job cards must be issued to cover. A single job may accumulate half a dozen job cards by the time it is completed. But the full record is there. The foreman returns job cards with the work order at the finish of the job, bearing the names of all craftsmen who worked on that job.

The area engineer may attach a job card to an MRO or major project when he first sends the order to the master mechanic's control office. Or he may send the card down later when the job is scheduled. But all job cards, like work orders, always clear through the control office. Once in a while the control office itself issues a job card to answer a "know-how" question it can answer best.

More on next page

PLANT ENGINEERING ESTIMATED CRAFTS REQUIREMENTS IN MAN-DAYS

ENGR.	JOB NO	DESCRIPTION	M.W.	WELD	MACH.	ELECT.	PIPE	TIN	CARP.	PAINT.	RIGGER
CLARKE	3-3554-21	REINSTALL #4 MIXER	(4)			(2½)	(2)	(2)			
	5-3510-19	OVERHAUL 51 UNIT EQUIP.			(2)						
	B-673-19	MAKE CYL. FOR SCREEN CHANGER			(2)						
	1-3638-21	INSTALL OIL GEAR AT REELER	(4)	(½)							
	E-6683-19	SHARPEN B. & J. CUTTER KNIVES	(2)		(1)		(2)	(2)			
	B-552-22	MAKE SPACERS FOR SLITTER			(1½)						

3. Each week area engineers list jobs to be done and show crafts and man-days needed. Maintenance superintendent combines these reports in a worksheet for each craft. He then draws up a master schedule

Here's how the new scheduling system works

Now we are ready to describe how Monsanto worked out the three basic solutions mentioned near the beginning of this article:

1. FAIR DISTRIBUTION OF LABOR · Every Thursday the area engineers prepare a summation of jobs wanted within their areas. In doing this they work in harmony with the production supervisor to decide which jobs are most necessary. They suggest machine down-time dates to fit productive schedules. (See Figure 3.)

This list includes an estimate of manpower requirements by crafts for each job, in units of man-days. Most jobs are big enough to be measured this way. A few are measurable in half-days. Lest you think a man-day is a broad and loose unit, it's close enough for the purpose. Remember, if the job takes less time, there are unscheduled minor repairs to fill in the gaps. Point is, the important jobs get done when they should.

The weekly area lists go to Ted Haselton, maintenance superintendent. He combines them all on a worksheet, one for each craft. This he does by "taking off" the hottest jobs and scheduling them by priority and urgency. After picking off the cream, he schedules others in order of importance. But he is careful to balance the assignments so that no one area gets more than its share. When completed, the worksheets serve as a basis for a formal daily master schedule for the week, broken down by crafts, as shown in Figure 4.

In the "taking off" procedure, Ted Haselton circles the assigned jobs with a blue pencil. Later he rechecks each list and circles the left-overs (unscheduled) in red. These simple procedures have two important benefits:

1. It is possible to totalize the amount of unscheduled jobs weekly and watch the trend in workload. You can then nip underloads or overloads in the bud. And you can adjust personnel without sudden layoffs or a mad scramble for more skilled men.

2. If the unscheduled jobs are piling up, you can assign more men to do that type of work. If you find yourself going short of manpower temporarily, you try to sub-contract some of the work.

After Haselton draws up the tentative weekly craft schedules, he checks dry-run copies with area engineers, master mechanic, and assistant master mechanic, and gets a final OK from the plant engineer. Then the plant engineering office makes up some 63 sets, which go to:

Production: each manufacturing superintendent, each general superintendent, each area production supervisor (28 copies).

Maintenance: plant engineer, maintenance superintendent, master mechanic, assistant master mechanic, each area engineer, each foreman and assistant foreman of each craft (35 copies).

The weekly craft schedule is an open book. Everybody knows what is expected of him. As soon as the area engineer gets his copy, he sees to it that job cards are in the control office to issue to the craft foreman not later than the day before the job is scheduled. In most cases the job has been thoroughly engineered before then.

2. CLOSE CONTROL OF ORDERS · All work orders channel through the master mechanic's office in two-way flow. It's the work control center. About 150 MRO's come in daily from production via the area engineers. Job cards follow later.

The control office assigns work orders (MRO's from production or projects from plant engineering) to the crafts. It specifies "starting date" and "time" in the space provided on the job card.

WEEK ENDING 3/18/51

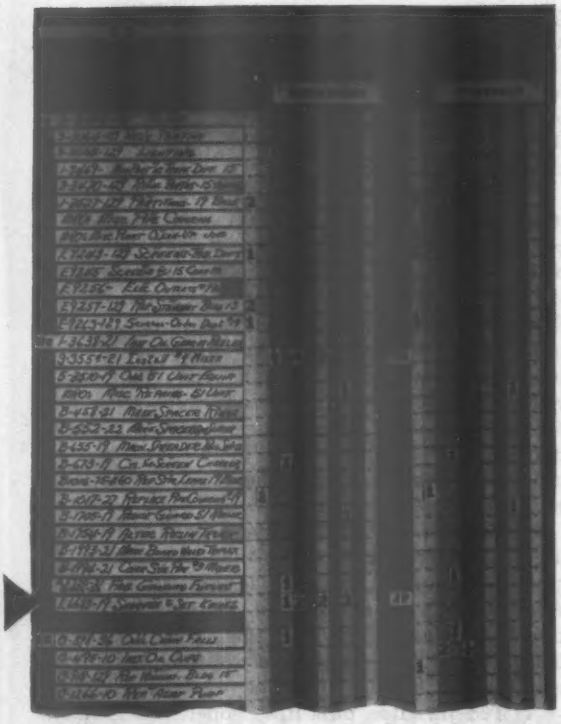
COVER	REMARKS
	WEDNESDAY
	IN PROGRESS
	WELDER NEEDED FIRST DAY OF MILLWRIGHT WORK
	WEDNESDAY 8 A.M.

by picking off jobs in order of their importance.

MILLWRIGHT SCHEDULE — WEEK ENDING 3/18/51

ENGR	JOB NO	DESCRIPTION	MON.		TUES.		WED.		THURS.		FRI.		SAT.		SUN.	
		SHIFT	2	3	2	3	2	3	2	3	2	3	2	3	2	3
		TOTAL MAN-DAYS	24	4	24	4	20	4	24	4	24	4	4			
		SHOP SCHEDULING	3	2	3	2	0	2	3	2	3	2				
		MRO's UNSCHEDULED	1	2	0	2	0	2	0	2	0	2	4			
		ILLNESS	1		1		1		1		1					
		VACATION	2		2		2		2		2					
CLARKE	E-6683-19	SHARPEN, SET KNIVES					2									
GURNEY	5-3343-80	N. SLURRY HOLD TANK	2		2		2		2		2					
FINCH	1-2999-64	INSTALL ALKYLATOR AGITATOR	2				2		2							

4. Master schedule insures each area its fair share of work. Once agreed upon, it is circulated to all production and maintenance heads.



5. Schedule board, always a day ahead, lists jobs to be done and number of craftsmen needed.

The master mechanic watches job methods and quality. His assistant handles the administrative procedures with the help of a full-time dispatcher. They all work closely together.

Sometimes after a job is started a craft foreman needs more information than already given on the job cards. All questions arising in the field or the shops that can't be answered on the job are channeled back *through the control center*. The control center arranges the proper contacts or gets the needed answers. It's simply an efficient division of work—*planning* by the area engineers and control center, *doing* by the crafts. The idea is to keep the non-productive and time-consuming deliberations away from the crafts.

Heart of the control center is the scheduling board (Figure 5). It is about 4½ feet high and 11 feet long. It hangs on one wall of the room behind the dispatcher's desk. Across the top is a single stripe of different key colors showing the number of men in each craft. This number varies with shift assignments, illness, vacations.

The board has four identical sections, one for each major production area. The close-up photograph shows one section. Each horizontal line represents a work order (MRO or project). At the extreme left appear the initials of the area engineer or person responsible for the original information. There follow from left to right across the board the number and description of job, and the number of craftsmen needed for the job. Space for two days allows you to set up tomorrow's schedule without disturbing today's. Red numbers indicate high priority jobs; black numbers, all others.

There are 12 vertical columns for scheduling the craftsmen. These columns are painted in the same key colors as the strip across the top of the board. At the right of the craft columns is a column for the initials of the craft foreman responsible for a multi-craft job. The numbers hang on hooks. The initials and job strips slide into a slotted holder. All are quickly removable.

The big problem of a maintenance scheduling system is to obtain flexibility to meet unavoidable daily changes. See how this is done on the scheduling board, which is set up daily.

Basically, each day on the board is a duplication of the same day on the weekly master schedule.

More on next page

The job strips for schedule jobs are printed with black china pencil. As the completed work orders flow back from the craft foremen, the dispatcher is able to check progress of work.

Each craft foreman knows that he must report any variation in schedule to the control office. Thus the control center can plan for any needed adjustments.

So much for scheduled jobs. Non-scheduled jobs are grouped in a lump sum at the end of the board opposite a card reading "Miscellaneous MRO's." Here are shown the total number of men in each craft assigned to these minor jobs. This group also acts as a reserve pool for emergency jobs.

Monsanto has found no reason to control this pool in the same detail as major jobs. It would be easy enough to do, if needed, by using a supplementary board. You could slot this board lengthwise for each craft to hold copies of MRO's, with numbers of men that you assign to each area superimposed.

When an emergency job comes along, it is set up the same way as a scheduled job, but with a red-penciled card. It's up to the control office to decide which jobs in the pool to suspend for the needed manpower.

All scheduled jobs don't always go smoothly. When a job is held up, the reason is shown on the schedule board by flagging the job with a colored plastic insert over the job strip:

Pearl—held up by production
Red—completed before scheduled date
Green—lack of materials
Orange—manpower deficiency
Blue—lack of information
Yellow—canceled

The red and yellow are needed to account for all jobs on the published schedule. Thus the scheduling board always shows at a quick glance the up-to-the-minute score of the workload.

3. CLOSE SUPERVISION • Multi-craft jobs always pose the question: Whom do you make responsible? At Monsanto the control office assigns one man as the "person of prime responsibility" (PPR). He is usually the foreman or assistant foreman of the craft chiefly involved. He is the man whose initials appear in the extreme right column of each section on the scheduling board. However, foremen of other crafts involved don't drop their responsibility. They do benefit by a decided cut in time spent on details now handled by the PPR.

The PPR directs all crafts involved, but he can call on craft foremen for more knowledge. And they, in turn, must operate through him. He works closely with the area engineer, but the engineer's written job cards must still clear through the control office. The office may make one foreman the PPR of several jobs, depending on their location and size. On large projects, such as construction or installation jobs that may call for as many as 20 or 30 craftsmen, the PPR is more or less resident until the job is over.

In making a PPR assignment, the control office delivers all information—work order, plans, engineer's job cards—to the PPR before the starting date. The information includes a summary job card showing the total number of craftsmen involved, also a duplicate of each separate job card it sends to each craft foreman. In this way the PPR knows what men are involved, and how many. Also, the foremen know who is their PPR.

Following the same rule as with single-craft jobs, the control office issues job cards and duplicates for every change in the job, whether specifications, scheduling, or work instructions. This alerts all supervisors concerned. Further, the assistant master mechanic consults with the PPR and foremen daily. He discusses the next day's schedule to pick up any variations to be made in manpower. He relays pertinent information to production or engineering supervisors.

A major benefit of the PPR set-up has been improved planning. It's the PPR's responsibility to coordinate all moves of a multi-craft job. This means he analyzes the job carefully and discovers the trouble spots before they happen and cause a delay. He notifies craft foremen in advance of impending difficulties. And, because most of these jobs require good liaison with production supervisors, handling by one person saves time both for production and maintenance. It means, too, that craft foremen have less ground to cover, and can concentrate better on the supervision of the fewer jobs they have left to do.

Changes on the schedule board by field revisions are surprisingly few—fewer than expected at the start of the system. Good planning is one reason. Also, foremen are expected to use their own initiative in solving minor problems. The system was designed not only to channel routine, but also to give enough latitude to avoid red tape delays.

As Ted Haselton puts it, "Cooperation is necessary all down the line, otherwise this thing loses its value." So one day when a job suddenly needed a welder in a hurry, nobody growled when a PPR yanked one off a non-scheduled MRO job. Sure, it wasn't rules procedure, but he was using his head.

Monsanto wants it definitely known that the procedures it has set up in its maintenance scheduling system are to be adhered to for guidance rather than as an inviolate directive. That's how it encourages initiative and cooperation without which, it says, the best scheduling system in the world can't possibly work.

PERSONNEL TECHNIQUES..... AND ...now in use in 277 plants employing 118,841 workers —in the Cleveland area	PERCENTAGE OF COMPANIES USING THEM (by size of company)			
	Less than 100 Employees 115 Companies 5519 Employees	100-499 Employees 108 Companies 25,091 Employees	500-999 Employees 21 Companies 14,199 Employees	Over 1000 Employees 33 Companies 74,032 Employees
Use aptitude tests	3%	6%	24%	36%
Conduct attitude surveys	4	6	10	33
Provide bulletin boards for union	51	81	86	88
Have credit union	1	19	38	49
Employ relatives of workers	90	87	86	97
Publish employee handbook	10	29	52	70
Use exit interviews	44	70	90	85
Give financial reports to employees	8	12	43	55
Conduct formal foreman training programs	10	35	71	70
Hire handicapped workers	68	77	95	97
Publish house organ	9	18	62	73
Have job evaluation program	26	40	48	58
Sponsor labor-management committees	18	29	38	9
Send letters to employees	17	28	43	55
Operate wage incentive system	40	55	71	73
Provide life insurance for workers	52	68	95	94
Provide sickness and accident insurance	42	62	90	82
Have pension plan for workers	17	15	52	64
Require compulsory retirement	3	5	33	33
Give Christmas bonus	63	54	24	12
Have cafeteria for in-plant feeding	3	18	71	79
Grant call-in pay	56	82	90	94
Allow clean-up time (personal)	40	47	43	43
Give special awards for old-timers	21	37	52	70
Pay on weekly basis	78	54	62	58
Pay by check	50	54	62	67
Require physical exam for new workers	45	69	95	97
Grant rest periods	39	42	62	36
Pay severance pay	19	8	5	18
Have "productivity improvement factor" in contract	2	10	14	15
Have escalator clause in contract	6	15	24	30

USE THIS CHECKCHART ↑ TO

Size Up Your Personnel Practices

This checkchart summarizes the highlights of a survey that covers practically all the important plants in the Cleveland area. So, when you use it to check your own practices, you can be sure you're not just comparing yourself with the "best" or the "big fellow." Your comparison base is the *complete* picture of the local practices of an entire industrial area. The survey was made by the Associated Industries of Cleveland, an organization that has earned national recognition for the quality of its personnel research.

OPERATING SHORTS

Blast Cleaning Doubles Tote Box Life

Two minutes in an airless blast cleaner every 2½ years will double the life of Caterpillar Tractor Company's 187,000 metal tote boxes.

Cleaning cabinet has two doors, each carrying a 66-in. rotating work table. When door is closed, table and the tote box are in cleaning position. One operator can maintain continuous cleaning because when one box is in the machine, the second can be positioned on the other door.

Each box is blasted in two positions, 1 minute for each position.

Source: American Wheelabrator & Equipment Company, Mishawaka, Ind.

Standardized Casters Save $25,000

Standardized wheels and casters are saving Lockheed Aircraft Corporation about $25,000 a year, according to the company's estimate.

At the start of the standardization program there were literally hundreds of different types of casters on the dollies, trucks, etc. The photographs show what standardization has meant in one department. There used to be about 80 spares. Now there are 6.

Benefits include reduced maintenance of both equipment and floors, lower on-the-shelf inventory, less worker fatigue—the new casters need about 20% less "push."

Source: Aerol Company, Inc., Burbank, Calif.

Own Laundry Gives Better Service

If you're still sending your wiping rags to the laundry — and many companies are — you'll do well to take a leaf out of Boeing's book. The Seattle plant of Boeing Airplane Company recently established its own laundry. It cost $9500, is expected to pay for itself in a year.

Two machines are used. The rags are washed in perchloroethylene, then spun almost dry, in one machine. In the the second machine, steam evaporates the remaining solvent. The laundry turns out 25 pounds of clean, sterilized rags in 15 minutes.

One Ladder Rail Is Better Than Two

At the top of the ladder, that is. There's service ladder and walkway on each section of the sawtooth roof at The Ingersoll Milling Machine Company, Rockford, Ill. Where they meet at the peak, one side of the ladder extends several feet for a handhold. The other side is cut off short.

Ingersoll says this is actually safer than the usual two-rail extension. A maintenance man going over the top can turn around to go down without getting his tools caught.

Weld Seams Smoothed 10 Times Faster

A special seam-rolling machine has increased output times on the job of smoothing weld seams at Ryan Aeronautical Company, San Diego.

The parts are tubular stainless steel exhaust sections. Formerly filler rod was used, and the resulting bulge was ground away by hand. It took a lot of time.

With the new seam roller, welders use no filler metal. Heavy pressure of the rollers —as much as 20,000 pounds—refines grain structure of the metal at the same time that it flattens the weld. Only a few seconds are needed for each section.

Temporary Power and Air Source

Welded steel "islands" provide a temporary source of power and air in test and assembly areas at Gisholt Machine Company, Madison.

These islands have receptacles for 110-volts, single phase, and 220 and 440 volts, 3-phase. The 220-volt receptacles are different from the 440, so lines cannot be plugged into wrong outlet. The islands also provide outlets for air lines for testing machines.

Islands improve housekeeping and cut out a hazard—there are no more long cords lying on the floor to trip employees, make maintenance difficult. Design was brainchild of Leonard Hisse, chief electrical engineer.

More on next page

OPERATING SHORTS... *Begins on page 120*

Air Ejector Unloads Press

Here's how to do it the easy way: At Reid Products Division, Standard Products Company, Cleveland, a curved piece of pipe and a jet of air make a high-speed press almost automatic. Air blows each piece off the press, through the pipe into a keg.

Company mechanics attached an air feed line with a nozzle at one side of the press bed. Opposite it is a 2-in. pipe leading down into a covered nail keg. As the ram goes up, the small part is blown up from the die. Once the press is set up, it can run unattended for hours. When the run is finished, the parts are all collected—in the keg.

Electric Impact Wrenches Save Dollars

Big Four Industries, Cincinnati, is saving labor dollars by using electric impact wrenches on assembly operations. Here are some sample results:

On an operation where nine nuts were formerly set by hand, labor time was cut by 1½ hours daily. Half an hour a day is saved on a bolt-tightening job. And the company saves two hours a day on a bolt-running operation.

Total annual savings on the entire assembly line will probably be more than $10,000.

Source: Independent Pneumatic Tool Company, Aurora, Ill.

Paperboard Locks Palletless Unit Load

Corrugated paperboard sheets, prefabricated to fit the load, form a tie-in unit load that can be handled by fork truck without a pallet. The paperboard sheets are wrapped around the bundles of shingles that make up the three bottom layers of the load. The sheets lock the bundles into an 1800-lb. unit.

A fork truck can pick up the load through the bottom layer or the next-to-the-bottom layer of shingles, depending on fork spacing.

Material cost for this load is estimated at well under $1.

Source: Stone Container Corp., Chicago.

INCENTIVE PLAN PAYS THIS OPERATOR OF A GROUP OF GEAR - CUTTING MACHINES TO KEEP . . .

4 Machines Running Instead of 3

By PHILIP B. JONES*
Industrial Engineer, Brown Instruments Division
Minneapolis-Honeywell Regulator Company

WE ALMOST DIDN'T—but we *do*—have an incentive plan for multiple-machine operation that really works. Almost didn't, because the variables sometimes seemed too tough to lick.

THE RESULTS • We've been using the incentive plan for something more than a year. Production rose 20% in the first two months. Performance on set-ups jumped 50%. Earnings climbed 20%. We've had fewer toolroom and inspection delays. And not one grievance.

THE PROBLEM • Four machines make up the group —three Barber Colman gear hobbers (two type "S" and one #6-10), and one Fellows gear shaper.

Automatic machine time on these four machines varies from 12 seconds to 20 minutes. Servicing time takes an average of 15% of the over-all cycle time. One operator is responsible for simultaneous operation of three machines. Also for making set-ups as needed. Two shifts operate full time.

THE GROUNDWORK • First thing we did was survey existing conditions. We found we could increase production on the "S" machines by buying more loading magazines and eliminating manual handlings. We set up a plan for pre-selection of set-up tooling. We brought process sheets up to date. We made additional gages available. And we revised the time-keeping system to insure fair payment to the operator and proper accounting of delay charges.

The existing layout needed no change. Scheduling was already in process of revision.

THE INCENTIVE PLAN • We require the operator to run three machines, as normal practice. He can make 25% bonus by keeping the self-feeding hoppers filled while the three machines automatically machine the gears.

Whenever he has to set up a machine, the operator gets an extra 10% time allowance on the machines in production. He can earn more than 25% bonus, depending upon the time he takes for set-up.

If he can and *wants* to run four machines at one time, we give him the work, let him earn some "gravy." Credited with production, but not charged with operating time of the fourth machine, the operator's earnings increase a third—if he keeps all four machines going.

THE STANDARDS • We took about 100 hours of time studies to develop standard data for both productive and set-up operations.

We worked up formulas to compute automatic machine time. A 10% allowance on this time provides the opportunity to increase earnings beyond the limits imposed by automatic machine time.

Machine-loading elements were defined and allowances developed. We installed more loading magazines on the machines to minimize manual loading time.

Set-ups posed a tough problem. We established a standard for the group of elements that occur on every set-up, plus standards for individual elements that occur only in some cases. Then we added formulas to compute allowed time to produce a few pieces for inspection approval. (A set-up is not complete until the inspector OK's a part.)

Multiple machine interference, which is what you get when two or more machines require manual loading at the same time, presented another problem. We set this allowance by time study.

In many cases machine interference varies with

*Now Industrial Engineer, Organization Planning and Evaluation, Corning Glass Works, Corning, N. Y.

machine servicing time. But we found our manual servicing time was such a small amount that the machine cycle time was the controlling factor. We drew curves of machine interference percentage related to cycle time. To pick the correct allowance, we just find the cycle time on the chart and read the corresponding interference factor.

A constant allowance for machine-and-tool care was found from the time studies. Sometimes incentive plans have arbitrary values for these elements, but we believe it's necessary to establish measured values—even for minor elements. An operator will have more faith in accurate, consistent standards.

Each operator earns a guaranteed base rate, plus extra pay based on his individual efforts. The only exception to that is the division of earnings on set-ups that start on one turn and are completed on the next. In that case we divide set-up earnings in proportion to time spent by each operator on the set-up.

On set-ups the operator indicates on the "set-up checksheet" the elements he has performed. The timekeeper computes the standard, and the time study department spot-checks the sheets for accuracy.

We found that an operator can run three machines simultaneously in most cases, so that's standard practice. We use the machine interference tables to determine when it's not economical to try to operate three machines at one time. Then we specify 2-machine operation. Those cases are rare.

THE CONTROL · Our production planning department tries to schedule the work so that cycle time will allow as much 3-machine and 4-machine operation as possible.

Cost standards are based on 3-machine operation. Operation of more or less than three shows up in the cost sheets as a variance from the budget. Management can easily see how well production planning, production supervision, and operators are co-operating to maintain good cost performance.

SET-UP CHECK SHEET DATE 4/25/51

B. C. TYPE "S", GEAR HOBBER

Previous Part No: 76583	Lot No: 4		
Present Part No: 353501	Operator:		
	#1	#2	#3
(1) REPETITIVE ELEMENTS: (TOTAL)	X	.9539	.9539
(2) MISCELLANEOUS ELEMENTS:			
Change Tail Center	✓	.0923	.0923
Remove Drive Center	✓	.0065	.0065
Remove Collet	✓	.0226	.0226
Change Drive Center Sleeve		.0189	
Assemble Drive Center	✓	.0305	.0305
Assemble Collet	✓	.0540	.0540
Insert Drive Center In Collet	✓	.0050	.0050
Change Hob		.1272	
Change Feed Gears	✓	.0274	.0274
Change Speed Gears		.0319	
Reverse Speed Gears	✓	.0159	.0159
Change Index Gears	✓	.0676	.0676
Get Pan of Gears	✓	.0051	.0051
Check Mesh of Gears	✓	.0042	.0042
Change Feed Cam		.0253	
Ass'm. Backing Plate (Bakelite)		.0329	
(1) Cut, Hand Feed (Bakelite)		.0470	
Adjust Deburring Attachment	✓	.0670	.0670
Adjust Work for Eccentricity	✓	.0170	.0170
Ass'm. Magazine & Adjust	✓	.6340	.6340
Clean Tray of Parts		.0177	
Ass'm. & Adjust Stripping Attach.	✓	.0838	.0838
(3) LOADING & MACHINE TIME			
☐ (A) HAND LOADED JOB: Production Std. × #Pcs/Load / 20 = X / 20 =			
☒ (B) MAGAZINE LOADED JOB: Production Std. / 5 = .510 / 5 =			.1020
TIME STANDARD IN HOURS (One Machine Operation) =			~~2.1885~~ 2.19

OPERATOR MARKS WHAT HE DID to set up machine. Timekeeper calculates standard time. Engineer checks.

Look among the advertising pages each month for . . .

. . . **Important New Catalogs** · We list 38. They're all free. A 3¢ stamp brings you the ones you want. Send in the coupon. We'll do the rest. **Page 139.**

. . . **What's New in Equipment** · The latest in plant equipment and services for efficient, low-cost plant operation—like the new fork truck carriage that works four ways. **Page 152.**

. . . **Significant Labor Developments** · If you have a check-off clause in your contract, did you know that general assessments are not periodic dues? Paul King tells you about it, and answers a lot of other labor questions. **Page 216.**

. . . **You Mustn't Miss** · New press loader with speeds up to 1220 pieces per hour . . . making plain steel work like stainless . . . the low-down on worker shortages . . . advantages of electroformed dies. **Page 246.**

. . . **Plant Engineering Problems** · Carl Wyder tips you off on what to do about worn-out window sash, vibrations, lead-acid batteries, and a dozen other tough maintenance headaches. **Page 276.**

. . . **Books and Booklets** · For instance *Industrial Piping*, by Charles T. Littleton. A guide for plant engineers and maintenance supervisors. **Page 302.**

GLASSED-IN LOUNGE IS FAVORED NOONDAY HANGOUT FOR EMPLOYEES AT TESTO MANUFACTURING COMPANY

FOR EMPLOYEE COMFORT—AND RECREATION . . .

WHY NOT

A Roof Garden and Fish Pool?

THERE'S NOTHING SO NEW about a pond on a roof to keep a plant cool. But the pond on the roof at Testo Manufacturing Company does more than that. It serves also as a recreation center.

The photograph shows how. This Cleveland metal-working plant has transformed its cooling pond into a fish pool and water garden.

Semi-aquatic plants line the pool. It's stocked with fish. Goldfish, sunfish, bass. About 800 of them. Bass have spawned there. At last count there were 42 frogs in the Testo chorus.

The water is anywhere from a couple of inches to a foot deep. Testo hasn't had a leak so far.

CUTS COOLING LOAD · The pond doesn't do all the cooling. There's also a mechanical cooling system in the plant. But the pond does a lot to cut down the load on the system. The company says it knocks off 15 degrees on a 95-deg. day. That means the cooling system has only to drop the temperature another 8 degrees to get it down to the 72 degrees prescribed for true comfort.

So the whole thing is practical. Henry Testo, the company president, thinks he has found the answer to the big city plant's prayer. You get a cooling system and a recreation gimmick all rolled up in one. Dry sections of the roof, he adds, might hold luncheon tables. And why not canopies and trellises for shade?

BE SURE OF YOUR ROOF · That's a pretty obvious precaution you'll have to take before you follow the Testo example. You'd better check: .

Roof construction: Testo's roof is a concrete deck with one coat of high-heat tar, one layer of muslin, eight layers of tarpaper, three coats of tar, ½ inch of gravel, copper flashing around the sides.

Roof size: 174 feet long by 26½ feet wide. Garden now covers about one-third of it. Company is planning to increase its size.

Roof load: about 18 pounds per square foot.

Cost of water: not over $50 a year. Testo keeps make-up water flowing into the pond. Overflow is screened and down spouted.

TEST YOURSELF: HOW GOOD ARE YOU AT GETTING BETTER

...BY DEMOCRATIC LEADERSHIP?

1. You call a meeting of your subordinates to discuss a storage problem. It degenerates into a round of bickering, charges and counter-charges of space hogging, and so on. Would you—

(a) give each man a chance to justify his own position? ☐
(b) eject the noisiest? ☐
(c) elect a committee to find out what the storage situation is at present? ☐

2. One of your group tells you, "I like Pete X personally. But he's so slow he hampers me in my work." Would you—

(a) ask Pete what's slowing him up? ☐
(b) discuss the problem with your superior? ☐
(c) dig into the matter to learn the background? ☐

3. You get the complaint: "Joe Y isn't doing his job, and is pulling down our group performance as a result." If this confirms your own observations, would you—

(a) try to get rid of Joe Y, by transfer or dismissal? ☐
(b) discuss the matter with Joe? ☐
(c) discuss the matter with your superior? ☐

4. You find your group dividing into two camps. Embarrasingly enough, you yourself are at the core of the controversy. The faction favoring you numbers about the same as those opposed. Would you—

(a) try to win over the con's by favoring them over the pro's? ☐
(b) try to rectify in yourself the quality that's causing the split—whether you think it's being fair to yourself or not? ☐
(c) take up the problem with your superior? ☐
(d) take up the problem with the ringleader of the con's? ☐

5. One of your employees convinces you that a company policy is "taking the heart out" of the group and thereby blocking its unstinted effort. Would you—

(a) wink at observance of the policy, since the result will be better group performance? ☐
(b) try to sell the group on the policy, regardless of your personal feelings, because that's the course loyalty to the company dictates? ☐
(c) Consult your superior? ☐

6. One of your people is shy, lacks self-confidence, and doesn't join in group discussions. Would you—

(a) try to build his self-confidence by assuring him, in private conversation, that he's as capable a speaker as anyone in the group? ☐
(b) try to steer a discussion around a subject you know he has well in hand, and then toss the ball his way? ☐

7. A new employee comes to you and says: "I'm trying to do a job here, but several of the fellows have been telling me to ease off or else. What shall I do?" Would you—

(a) fire him for the sake of restoring harmony to the group? ☐
(b) let the group know they either match the newcomer's performance or they're through? ☐
(c) try to analyze the factors that account for this superior performance? ☐
(d) try to stimulate the group to match his performance? ☐

...BY AUTOCRATIC LEADERSHIP?

1. A member of your group, with a strong sense of rivalry towards you, forms a clique which tries to block achievement of the goals you set. If you have no doubt of his intentions, would you—

(a) fire him? ☐
(b) make him your assistant? ☐
(c) break up the clique by shifting the individuals around? ☐
(d) tell him, in effect, that you know what he's up to, but as long as he does his work satisfactorily, it's O.K. with you? ☐

2. You get this story from a group member: "I've worked in a lot of places before, but I've never been expected to work as hard." Would you—

(a) tell him he can leave if he's dissatisfied? ☐
(b) ask him to back up his statement with facts? ☐
(c) find out whether what he really meant was that he was working harder than he was able? ☐

3. You hear from somebody: "Joe Jones is a slick operator. He's doing such an outstanding job just to get in good with you." Would you—

(a) fire Joe? ☐
(b) reprimand your informant? ☐
(c) tell your informant, "Let everybody know that Joe is achieving his purpose. And anybody else can do likewise by adopting Joe's method?" ☐

How Good a Leader Are You... ...at Getting Better Production

By AUREN URIS • Editor, Research Institute of America, Inc., New York

Is the work getting out — easier, faster, better? That's the big test for any leader. Here's an analysis of what's involved in passing this big test — and practical guides that are designed to help you do the job better. This is the fourth in a series of four articles that began in July.

4. Is your highest award (advancement or other sign of approval) generally given to the man who —

(a) does the best job? ☐

(b) tries the hardest? ☐

(c) has shown the greatest personal loyalty to you? ☐

5. You find there's a difference in group effort when you're present and when you're not. Would you —

(a) try to discover who the principal slackers are? ☐

(b) make it your business to stick around when the group's at work? ☐

(c) put more emphasis on accomplishment, work goals, meeting deadlines, and so on? ☐

6. Whom would you commend most highly: the man who —

(a) succeeds, despite handicaps, in doing a job? ☐

(b) is always helping the other fellow? ☐

(c) sacrifices self-interest for the sake of group achievement? ☐

7. Two of your group are caught in a serious infraction of rules. One is a newcomer; the other is a valuable oldtimer. Would you —

(a) punish both equally? ☐

(b) punish neither, in order to be fair? ☐

(c) punish the newcomer more severely, making it clear that you consider the oldtimer's favorable record a mitigating circumstance? ☐

. . . BY FREE-REIN LEADERSHIP?

1. You disagree completely with the line of activity one of your people is following towards an assigned objective. You grant that the disagreement is basically a matter of opinion. Would you —

(a) let him follow his own inclinations? ☐

(b) pressure him into adopting the direction you prefer? ☐

(c) compromise on a course between the two opposed ideas? ☐

2. One of your people refuses to come to you with his problems, even though he's pretty well stymied. He says he'd rather "muddle through it in his own fashion." Would you —

(a) permit him to follow this course? ☐

(b) try to help him resolve the difficulties? ☐

(c) let him know that either he comes to you with his problems, or he's in for trouble? ☐

3. One of your people is clearly trying to take on the role of informal leader. His actions are limited to such steps as speaking up for the group, trying to organize their activities outside the limits of the work, and so on. Would you —

(a) do what you can to remove him, if it can be accomplished gracefully? ☐

(b) step out, and let him run things? ☐

(c) accept him as informal leader to the extent of recognizing, for example, that he does speak for the group in some matters? ☐

4. One of your group tells you: "You've assigned me to a job I don't like. Why don't you have the new man do it?" Would you —

(a) adopt his suggestion? ☐

(b) fire him on the spot? ☐

(c) tell him why he was selected for the assignment and insist that he do it? ☐

5. Your efforts to get employee X to cooperate with employee Y on a mutual problem are fruitless. They refuse for personal reasons. You realize you've made a mistake in trying to throw them together. Would you —

(a) insist that they obey orders? ☐

(b) have a three-way talk to try to settle the feud? ☐

(c) take up the matter in separate talks with each? ☐

(d) let the matter drop, since you can hand the job to two other employees? ☐

6. Would you give your most enthusiastic people the most trying jobs?

(a) Yes? ☐

(b) No? ☐

7. Would you give your least enthusiastic people the least demanding jobs?

(a) Yes? ☐

(b) No? ☐

Answers on page 129

WHAT PER CENT of their abilities would you say your subordinates use in their work? 10%? 50%? 90%?

One foreign industrial expert has estimated the answer this way:

"In Europe we use about 5% of our employees' ability. In the United States, the average is about 20%."

The "expert" is guessing, of course. So let's assume his 20% figure is low. Let's say that productive efficiency for your subordinates—that is, the extent to which they really use their aptitudes and abilities—is *twice* as high. That's still only 40%. There's still plenty of room to improve.

What's wrong? Why is there such an efficiency loss? What's blocking better production by your subordinates?

Generally, two big obstacles stand in the way:

Internal obstacles—things the employee feels, thinks, believes. Negative attitudes, notably. Here are some typical expressions of such attitudes:

- "The harder you work, the less brains they think you have. It's the guy who takes it easy that gets booted up the ladder."
- "Why should I kill myself on this job? The boss doesn't even know I'm alive."
- "As far as I can see, this job is just a high-grade kind of boondoggle."

External obstacles—things outside the employee that hold him down. There are two kinds:

- Organizational obstacles, where a subordinate's effort is poorly geared into the over-all activity. That's management's fault.
- Social obstacles, where personal relationships, feuds, and frictions cut down on efficiency, where fellow-workers often "turn the heat on the eager beaver." You can't blame this on management, but management weaknesses are often involved.

More on next page

How Can Leadership Help?

Your leadership skill in eliminating or minimizing the obstacles we've just discussed will largely determine the results you get. You'll get poor production if you're a poor leader, good production if you're good.

As mentioned in previous articles, the good leader is not a "one-shot Johnny." He's skilled in using the three basic leadership methods: *democratic, autocratic,* and *free-rein.* He uses them *all*—each where most appropriate. The person he's dealing with, the make-up of his group, and the situation—all help him decide which method to apply at any given time.

The big point to remember is that non-productive activity takes place only when leadership is ineffective. In fact, each leadership method can actually lead to poorer production by employees if improperly used.

Here are some examples of what happens when you *misuse* each leadership method—and suggestions as to what you can do to correct the various troubles you're likely to face.

1. DEMOCRATIC LEADERSHIP

The poor leader lets his group get out of hand. Subordinates use the chance for open discussion to sound off on gripes unrelated to the subject at hand. Instead of calming the group, the leader's "tolerance" only fans the emotional flames. Productive energy gets dissipated in bickering and petty rivalry.

The good leader realizes he doesn't have to be a doormat to be democratic. There's no need to neutralize yourself to give your subordinates the chance to participate more actively. In fact, you should be just as active as, say, the autocratic leader. But you'd be active in a different way: *You'd spend most of your time keeping your people on the track.*

For example: You suggest important problems that need attention, and get the discussions started. You keep the discussions on the beam, quietly putting the crusher on side issues. You help set up sub-groups or committees to handle problems that will waste time if taken up by the whole group. And, most of all, you keep building up the idea that democratic leadership isn't a social proposition. Its aim is strictly business—to get things done easier, faster, and better.

If you're having trouble using the democratic approach, check yourself on the above points. If you don't help channel your group's efforts, you'll have nothing but "gabfests" in practice. That's a big hazard you face any time.

2. AUTOCRATIC LEADERSHIP

The poor leader gets so involved in doing all the thinking, planning, and directing that he forgets one big factor—*motivation.* His people have no real interest in what they're doing. They work at a "get by" pace. When the leader isn't right there to watch over everything, it's even worse. Loafing and horseplay take the place of productive activity.

The good leader realizes that the autocratic method makes jobs less interesting, because the thinking and planning have all been done by the leader. So he tries to use other methods to keep his people "on the ball."

Setting up formal regulations, standards, and procedures to follow is one way to motivate a group. The people in it then have something definite to guide them. The army is a good example of an autocratically led organization that uses formal rules to keep productive activity up to desired levels.

The more common approach is to set up a reward system. The subordinate who does the best job gets recognition and reward in keeping with his accomplishment. It follows, too, that the man who fails to be satisfactorily productive is the target of criticism or worse.

Here are some things you can do to spruce up the motivation of your people, and build greater job interest:

You can see that they understand just what's expected of them—especially as to quality and quantity of output.

You can set up specific deadlines for job assignments: "Joe, I'd like to have that job done by day after tomorrow."

You can add "qualifiers" to your instructions that will keep you informed of progress, and emphasize the importance of the job: "We want to be sure this job comes out right. So let me know at once if you have any trouble at all anywhere along the line."

You can—you *must*—be completely fair in dealing out rewards and punishments. And you can be sure the *whole group* understands the reason for them: "Bill, you earned this promotion because of that swell job you did in getting the kinks out of that bottleneck spot you were in." Don't just tell Bill. You want his fellow-workers to know, too.

Remember this about autocratic leadership: You can't count on "personal loyalty" to stimulate greater productive efficiency. What you want is *active interest*—in the assignment, the job, the department, and the company. If you do a sound, fair job of motivating subordinates in those directions, you'll probably also get personal loyalty

from them. But it will be—and should be—a *by-product* of good leadership.

3. FREE-REIN LEADERSHIP

The poor leader finds that one of his big troubles is that his people lack "goal-mindedness." Where several people have a piece of a job to do, they fail to finish on time. And, when they do finish, their results don't "mesh." They're easily distracted, tend to work in spurts, often unknowingly duplicate effort.

The good leader understands that "free-rein" doesn't mean "no-rein" leadership. He still has a responsibility to be sure subordinates know the over-all goals they're supposed to be working toward. And he has to see that assignments are specific enough to prevent overlapping or excessive dawdling.

It's easy to get off the track on these points because the men in a free-rein-led group are generally of high intelligence, pretty good experience, and high drive to start with. But men aren't all equal—even high-caliber men. Some will need more rein than others. So the first constructive step is to find out enough about each man to know how much he can be left to his own devices.

Of course, the obvious solution to part of the problem is to pick the right people to start with. To get good results under free-rein leadership, you need to pick men who can work successfully on their own. Once you hire a man who's short on drive and initiative, you need a magician or psychiatrist, not a mere leader.

You can also improve productive output by good indoctrination of new men. Stress the importance of the job, the goals the department is striving for, and the need for plenty of personal drive.

And you can profit from follow-up. It needn't be formal but it should consist at least of sitting down every once in awhile to talk things over. Let each man know how he's doing. More important, even, find out from him *how he thinks he's doing.*

One good point to keep in mind, too: If you find yourself constantly in hot water with a group under free-rein leadership, don't be afraid to experiment. Perhaps you've over-estimated the caliber of the people in the group. They may not be able to live up to the demands of the free-rein situation. Perhaps more interchange of ideas—and group planning—would be better. If so, try out some democratic leadership ideas. Or maybe *you* ought to do more of the thinking and planning for them—which might suggest a tryout of some autocratic leadership ideas.

Whatever you decide to do, one thing is pretty clear: You won't boost output by keeping your brain in neutral. Alertness to the need to change your technique is just as important as your skill in applying it.

ANSWERS TO LEADERSHIP QUESTIONS

DEMOCRATIC

1c.

2c. It's wise to check any such statement before taking action.

3b. It's always a good idea to learn what's behind a so-called fact on which may hinge a decision with a built-in kickback.

4d. 4b is often a tempting solution because it seems to be an easy out. Trouble is, a situation of this kind is usually deep-seated. As soon as one source of friction is removed, two spring up in its place. For that reason, it's generally your strongest move to put the cards on the table with the opposition.

5c.

6b.

Either 7c or 7d, depending on specific circumstances.

AUTOCRATIC

1d. You strengthen your leadership position and weaken his standing by calling the turn in this manner.

2c.

3c. That's the old Lincoln approach. And it worked with Grant.

4a.

5c. In a situation of this kind, long-range measures are indicated.

6c.

7c.

FREE REIN

1a. It's typical of free-rein leadership that the leader largely follows a hands-off policy. If this policy is impractical, then the leader should not be using the free-rein approach.

2b.

3c.

4c. Using the free-rein approach does *not* mean you fail to assert authority when necessary.

Either 5b or 5c, depending on the degree to which the feud is explosive.

6a.

7b. The difference between questions 6 and 7 is this: Implicit in the course suggested in 6a is the reward of satisfaction in polishing off a tough job. But to give the easier jobs to the weaker group members as a matter of policy would be an unfair distribution of the work.

SCORING

Score each section of this quiz separately. Give yourself 10 points for each correct answer. Rate yourself according to the following chart:

60-70 Outstanding
40-50 Good
20-30 Poor

Then compare the scores you've made in each section, to see where your strong and weak points lie.

President Truman has approved a new "Industrial Dispersal Policy." He has directed the heads of all Executive Departments and Agencies "to adhere to this policy with respect to programs under their control."

These are the measures in the President's directive that are to be taken to put the policy into effect:

"1. To the greatest extent practicable, certificates of necessity, allocations of critical materials for construction purposes, and emergency loans growing out of defense production will be confined to facilities which meet satisfactory standards of dispersal.

"2. Primary consideration to dispersal factors will be given in locating facilities built by the Federal Government.

"3. Defense contracts will be awarded, and planning under Department of Defense production allocation programs will be conducted, in such a manner as to make maximum use of facilities located in dispersed sites."

So here's . . .

HOW TO SELECT
A PLANT SITE THAT FITS THE

NEW RULES FOR INDUSTRIAL DISPERSAL

THIS IS *NOT* SENSIBLE DISPERSAL

A lot of people think "industrial dispersal" means locating your new plant 100 miles from nowhere. The government now says no. You can . . .

WE'VE HAD THREE YEARS of platitudes and press releases about the need for industrial dispersal. Now the government has finally announced a firm policy.

This new policy has teeth in it. Take a look at paragraphs 1 and 3 of President Truman's directive (above) on how to implement the policy.

Boiled down, it means this:

Follow the rules of locating new plants, or you run the risk of (a) no fast tax write-off, (b) no materials for construction, and (c) no defense orders.

There are two key points in this new policy you don't want to miss:

1. *The policy applies only to the location of new plants.* Truman's directive leaves a loophole for applying principles of dispersion to existing industry. But it contains a long song and dance about

HOW TO PICK A "SECURE" SITE

In selecting dispersed areas for development of industrial sites, security is the first and most vital consideration. Based on present and anticipated military weapons, the following security standards should be considered:

1. **These industrial areas should be 10 to 20 miles from any densely populated or highly industrialized section of an urban area. However, this dispersal distance may be less when additional protection is provided by rugged topography or protective construction.**
2. **Industrial development areas should be 10 to 20 miles from such prime targets as major military installations.**
3. **Industrial development areas should be located a sufficient distance from one another so as to avoid clusters creating new targets.**
4. **Industrial development areas should be limited in size to avoid any concentrations which would create new targets. Consideration should be given to the size of both industrial development sites and the communities that will result.**
5. **Sites, desirably, should be served by more than one transportation facility in order to insure continued production and distribution.**
6. **Sites, desirably, should be located on power and other utility grids, so as to permit alternate sources.**
7. **Other standards based on local conditions should be considered.**

LEGEND

INDUSTRIAL SITES — POWERLINES
WATER MAINS — GAS MAINS
HIGHWAYS — RAILROADS

THIS *IS* SENSIBLE DISPERSAL

. . . get maximum protection from atomic attack by locating your new plant 10 to 20 miles from present concentrations of industry. It's easy to find "secure" locations if you follow the rules. And, under the new directive, it's the only way to be sure you get certificates of necessity and construction materials.

not disturbing existing industrial patterns, because this would "cripple efficiency and productivity." The policy, therefore, "is directed mainly toward . . . new and expanding industries."

2. *The policy provides an understandable and sensible definition of industrial dispersal.* For too long, the government had done nothing to dispel the idea that dispersal meant moving plants into the wilderness—areas where there is no transportation, no power, and no labor supply.

Now we are told that dispersal means locating new facilities "10 to 20 miles from any significant concentration of industrial capacity or metropolitan center."

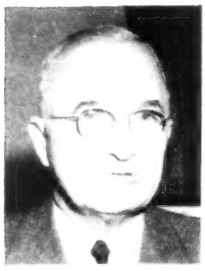
The Truman statement includes this paragraph:

"Sites which meet dispersion security standards can be found in local marketing areas adjacent to industrial or metropolitan districts in all sections of the country."

If you are planning any expansion—and particularly if a new plant is involved—you will want to know lots more about this new policy.

A good place to find out is a colorful booklet called, "Is Your Plant a Target?" It was prepared by National Security Resources Board. You can get it from the Superintendent of Documents, Washington 25, D. C. Price, 25¢.

There's a lot of propaganda in this booklet. But there's also a lot of solid advice. The last page, for example, is a checklist of factors to be considered in plant location. And there's a good discussion of how either a company or a locality can organize and execute a dispersal program. You'd better get a copy.



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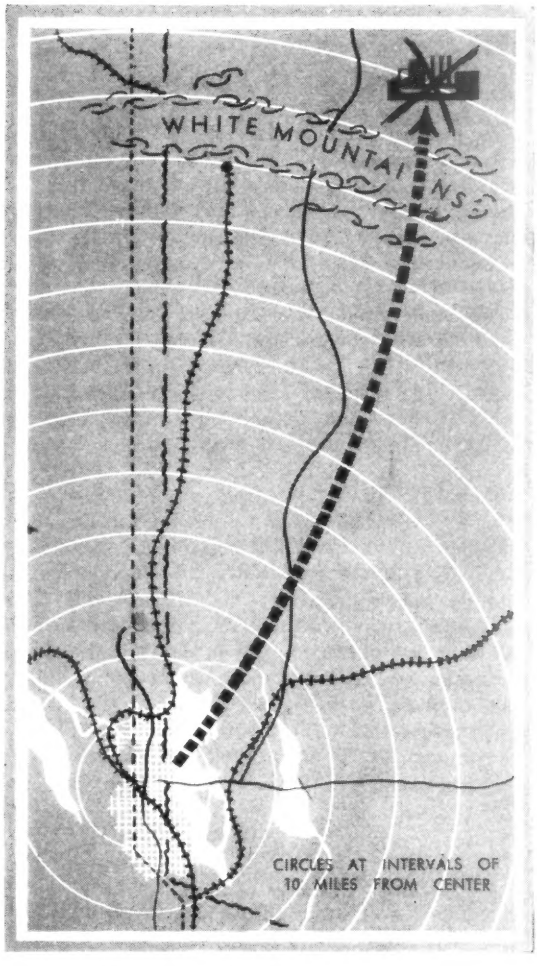

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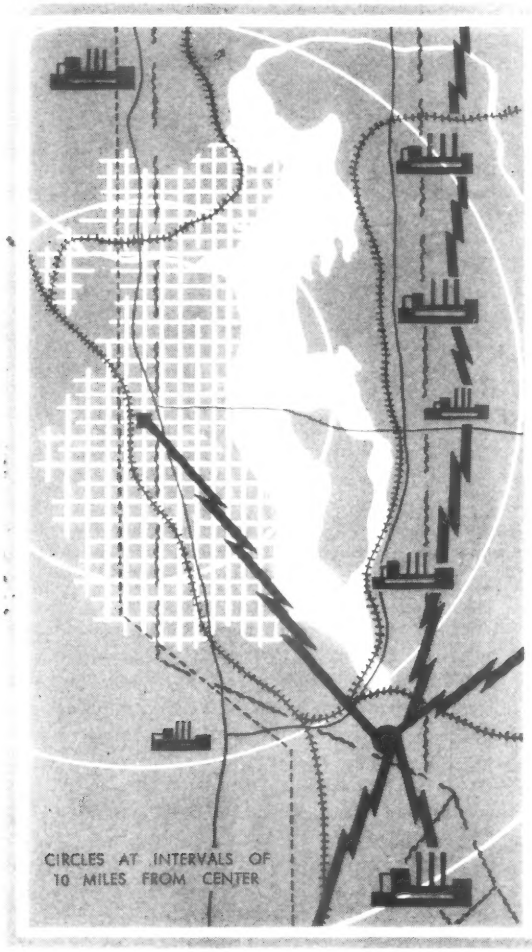

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TIPS TO GOOD HUMAN RELATIONS for factory executives

By M. J. MURPHY • Industrial Relations Editor, FACTORY

CURES FOR WORKERS' TELEPHONE-ITIS

Personal phone calls are tough to control. If they're important, you want workers to make them, or get them. But if you make it too easy, you tie up switchboards and waste a lot of employee time. For a good middle course—fair, but not a pushover—here's what Bell Aircraft Corporation, Buffalo, does:

For incoming calls, Bell uses the novel device of a special phone number, like the method used for reporting absences. Keeps regular business lines free. And for outgoing calls the company uses the standard device of phone booths with direct outside connections, located conveniently around the plant. Supplementing this is a good publicity program asking for cooperation in keeping calls down to minimum. Then, to make the policy "stick," Bell advises employees that operators have been instructed to monitor outgoing calls and to ask employees to give their names when making such calls.

Some companies carry this latter point one step further by asking employees to state whether their calls are "personal" or "business." Personal calls are charged to the caller at cost. If handled courteously, and applied to *everybody*, these policies work well. If favoritism creeps in, they're dangerous.

HOW EYE TESTS GET RESULTS IN THE SHOP

Is poor vision just the worker's worry? Not on your life, reports Motorola, Inc., Chicago. Here's why, based on a sample of what Motorola has been getting out of vision testing:

Inspectors: Tests showed that 30% lacked the precise visual skills needed for their jobs. *Results:* Within two months of the time inspectors were wearing exactly the right type of glasses for their jobs, defects dropped 75%.

Line operators: Tests showed that 35% could not meet the visual standards for the job. *Results:* By correcting existing defects and hiring only people who met job standards for vision, turnover went down 10%, and attendance was up 5% in one year. Number of rejected sets dropped from 15% to 7%. This happened while Motorola was doubling its work force, mostly by hiring inexperienced people.

HOW TO HANDLE CHARITABLE CONTRIBUTIONS

There's no simple solution to all the annoying problems that come up when you have to decide what to do about charitable contributions. But here's a good policy statement that's helping

Scully-Jones & Company, Chicago, to make better decisions:

"1. Only recognized charitable organizations will be considered. (Should be endorsed by Association of Commerce or reported on by Better Business Bureau).

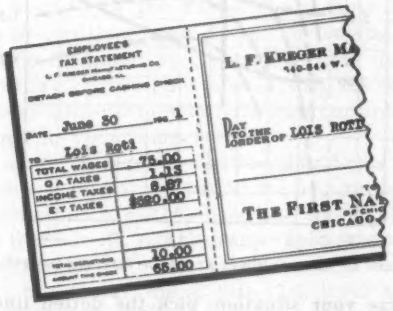
"2. Only letter or personal solicitation accepted. Telephone solicitation will not be considered.

"3. Preference should be to direct contribution rather than ticket purchases to affairs sponsored by charitable organizations.

"4. Preference in budget will be given to Community Chest drive and various well-recognized national drives such as Red Cross, Cancer, Heart, etc.

"5. Neighborhood organizations in our community (Boy Scouts, etc.) should be favored in help rather than giving through downtown headquarters office.

"6. Organizations in which employees or officers are active should be given special consideration."


EMPLOYEE'S
FAX STATEMENT

L. F. KREGER M.
140-844 W.

DATE June 30 NO. 1

TO Lois Rotl

PAY TO THE ORDER OF LOIS ROTE

TOTAL WAGES	75.00
O A TAXES	1.13
INCOME TAXES	8.87
E Y TAXES	$280.00
	10.00
	65.00

THE FIRST NA
OF CHIC
CHICAGO

RIGHT AND WRONG WAYS TO TELL TAX STORY

The check stub shown above is an example of the right way to tell workers about taxes they pay. That's the conclusion of L. F. Kreger, president of L. F. Kreger Manufacturing Company, Chicago. He feels that, without knowing it, most employers help to misrepresent the tax picture by using the wrong words and wrong approach. For example:

Why list the "employee contribution" to the Social Security law as "old age benefit," or, worse, just as "OAB"? It's a *tax*, so should be listed at least as "OA taxes." And "withholding tax" is income tax. Why not call it by its proper name?

Moreover, Kreger points out, year-end statements showing total tax "contributions" have no impact. By that time they're paid, and easily forgotten, just as were the small weekly amounts that made them up. Here's where you can tell the employee his estimated yearly tax ("E Y taxes"), so he can really appreciate the size of the tax bite. This is all part of the ingenious #7X-2 Kreger Payroll Plan. You can learn more about it by writing L. F. Kreger Manufacturing Company, 540 W. 35th St., Chicago.

To tell the rest of the tax story, Kreger also has ingenious "needle stamps," that you can stick on most anything. They show impact of taxes on things you eat or use in everyday life.

TURTLE CLUB FOR HARD HAT WEARERS

No, you don't have to be a turtle to join a Turtle Club. All that's needed is evidence that wearing a safety helmet ("hard hat" in the shop) kept you from having your brains knocked out.

Patterned after the Wise Owl clubs for employees whose sight was saved by safety glasses, the Turtle Clubs are just another good way to keep up interest in wearing proper apparel. A fine way to put some extra zip into your safety campaign if yours is a plant where hard hats are the rule.

The E. D. Bullard Company, 275 Eighth St., San Francisco 3, will send you copies of the Turtle Club constitution and by-laws if you're interested. Successful applicants for club membership will get from Bullard a certificate, a Turtle Club hat decal, and a bronze lapel button. Everything's free.

Bullard's interest: It makes safety equipment and supplies, apparently feels it can render a real service by encouraging workers to wear proper equipment, regardless of who makes it.

"YOHUDI" SHOWS PROPER WAY TO LIFT

Back injuries are on the decline at Puget Sound Power & Light Company, Seattle. And "Yohudi," the company's ingenious mechanical man, is responsible. His main asset is a spring, like a butcher's scales, built into his back. Push him in the right place, and he'll lift his burden. When he lifts it properly, the spring shows only 3 pounds. When he lifts it improperly, the pointer jumps to 13 pounds. The company has a Yohudi in each of its operating divisions, uses him for fast, sound preventive training in safe work habits.

You Can Group-Replace Incandescents, Too

By FRED J. VORLANDER • Commercial Engineer
Champion Lamp Works, Lynn, Mass.

"YOU'RE THROWING MONEY away on haphazard replacement of fluorescent lamps," said Joe St. Andre, FACTORY's electrical editor, in the July, 1951, issue.

"OK," you say. "But I don't have any fluorescent lamps in my plant. I'm old-fashioned. I only have incandescent lamps. How about a plan for me?"

We have one. And we've found that group replacement of incandescent lamps can save you even more money than group replacement of fluorescent lamps. That's because the cost of the incandescent lamp is small in comparison to the cost of the labor used to replace it. The cost of the lamp is going down all the time. But the cost of the labor is heading the other way.

In the past, the rule-of-thumb recommended by the lamp industry has been to replace incandescent lamps when they have burned about 80% of their rated life. This was good economics for the consumer. But it created the impression that the lamp industry just wanted to sell more lamps.

Not so. But to counteract that impression, here's a practical, successful group replacement program that considers:

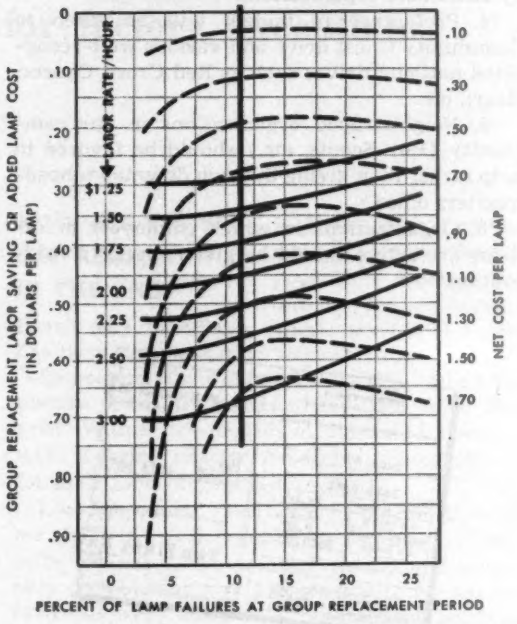
1. Average time required to change lamps individually or in groups.
2. Percentage of rated life of lamps when they are replaced in groups.
3. Percentage of lamps that fail and must be replaced between group replacement periods.
4. Labor rates, including the overhead "burden" factor that your plant adds to direct labor costs.
5. Net cost of lamps, including excise tax.

These are the values you must have in order to determine the cost of and the savings from a group replacement program for incandescent lamps. Inaccuracies of past incandescent group replacement programs has been due largely to the fact that one or more of these factors wasn't considered when the plan was formed.

LAMP-CHANGE TIME VARIES

You'll find a wide variation in the time it takes to replace a lamp in one plant and the next. Physical conditions are better in one than in the other. However, our studies—made in operating plants and not in our laboratories—have shown that it takes, on the average, 20 minutes to change an individual light bulb. But in a group replacement program it takes only 3 minutes.

COST ANALYSIS OF
INCANDESCENT GROUP REPLACEMENT
VS. INDIVIDUAL REPLACEMENT



To analyze your situation, pick the dotted line that is identified by your net lamp cost (figures on the right for the various dotted lines). Then take the solid line that is identified by your labor rate per hour (figures inside the grid on the left for the various solid lines).

Thus our studies show that, on the average, group replacement of incandescent lamps will save you 17 minutes per lamp in change time.

At today's labor rates, 17 minutes per lamp is a lot. Add to that an average overhead burden of 50%—and the saving is even greater.

BUT YOU HAVE TO PAY, TOO

In contrast, there is the added lamp cost you take on with a group replacement program. For, if you throw away lamps that haven't burned out yet, you're bound to buy more lamps.

Actually there is a point in the life of a lamp where it's really practical to throw it away. At this point lamps begin to fail much faster than before. So the cost of replacing the remaining lamps individually beyond this point will far exceed the value of the lamps removed and discarded.

NOW FOR A SPECIFIC CASE

The plant uses ordinary 300-watt lamps which have a normal rating of 1000 burning hours and a list price of 70¢—probably 50¢ net, including excise tax (If you use 150-watt lamps in your plant, you'll get even better savings than we get here—because the lamps will cost less, but the labor cost to change them will be just as high.)

Let's say the plant has an average maintenance system, where a lamp changer gets $1.50 an hour. Add an overhead or "burden" factor, and you'll find the labor cost will be at least $2 per hour.

In our example we'll use a group replacement time of 3 minutes per lamp change against 20 minutes per lamp for individual change. (If you think these figures don't apply to your plant, we'll show you later how to check yours.)

If you doubt our labor figures, there are formulas at the end of the article that we used to plot the curves. Take an afternoon off, substitute your own plant figures, and plot your own curves. We're sure your curves will look like ours.

Now let's apply these figures to the chart.

Here's how the chart works from our case example: Start with the $2-per-hour labor curve. Use the 50-cent lamp cost curve. The saving you'll get will be the point of greatest vertical distance between the $2 curve (the labor-saving curve) and the 50-cent lamp cost curve (the cost curve for the lamp used in your plant.)

Take a pair of calipers, and you'll find this greatest distance comes at a point on the horizontal scale which corresponds to 11%—the percentage of lamp failures that should signal group replacement time in this example.

Now a horizontal line at this 11% level will let us see what such group replacement will do to costs. Note that our 11% line crosses the $2 labor line at a point equal to 45 cents on the chart's horizontal scale. That means a labor saving by group replacement of 45 cents.

But the plant in our example will be spending more for lamps. Let's see how much more: Note that the 50-cent lamp cost line crosses the 11% horizontal at 19 cents on the chart's horizontal scale. That's the extra cost per lamp. So we subtract 19 cents extra lamp cost from 45 cents labor saving to get a net saving of 26 cents per lamp.

Remember, the chart showed that the best time for the example plant to group-replace was when 11% of the lamps had failed. From a chart of average mortality of incandescent lamps we find that this point of 11% failure comes at about 80% of rated life. Failure is rapid beyond this point. At 100% rated life, 50% of your lamps are burned out.

The point is, you can safely base your group replacement schedule on the number of lamp failures. That's much easier than trying to keep track of burning hours of the group of lamps included in the group replacement plan. Simply keep track of the number of lamps that fail after a group replacement. When the number reaches 11% of your total lamps, it's time to group-replace all lamps.

What about the cost of individual replacement of lamps between group replacement? The curves in the chart take this into consideration—and subtract the cost from your saving.

Now, if desired, these individual-replacement lamps can be marked. When all lamps are removed as a group, the marked lamps can be saved for use as individual replacements later.

But, if you study the curves, you'll see, from a cost standpoint, that it is better economics to discard all lamps at the time of group replacement. The cost of labor to change these partially used lamps will average more than the value of the burning life left in them. However, should material shortages become so acute that you find it hard to get lamps, then that is the time to start saving these individually replaced lamps.

THERE ARE OTHER SAVINGS, TOO

There are savings from group replacement that don't show on the chart. One is that you're not so likely to use larger lamps in your system than the system calls for. How many times does one of your maintenance men go out on a call with the right lamp? Rarely. And the lamp he puts in never seems to be too small. He makes sure he has enough wattage. Most of the time it's too much.

So your lamp load keeps going up. One of these days you'll blow a fuse or find one of your lighting transformers cooking. Group replacement will prevent this, because your electrician will know beforehand what lamps he'll need and have them.

Remember, once you've installed a larger lamp than necessary, it's impossible to reduce the wattage. That is, unless you want a labor dispute on your hands.

NOW TRY YOUR OWN FIGURES

Remember, we said you may not want to take our average times for individual replacement (20 minutes) and group replacement (3 minutes) of lamps. All right, you can use the following formulas to make your own curves to fit your special plant conditions.

Labor saving per lamp $= T - K_1(T_g + TK_2)$

Added lamp cost per lamp $= K_1 L_n (1 + K_2) - L_n$

$K_1 =$ **Rated or average lamp life / Group replacement life**

K_2 = **% of lamps to be replaced between group replacement periods**

T = **Average cost of time per lamp for individual replacement**

T_g = **Average cost per lamp for group replacement**

L_n = **Net price of one lamp, including tax**

The above formulas compensate for all possible variations that may occur in any maintenance system. When you use the formulas, make sure you use all the values. You will then find that group replacement is profitable and practical for your plant—large or small.

MANPOWER CONTROL CHARTS . . .

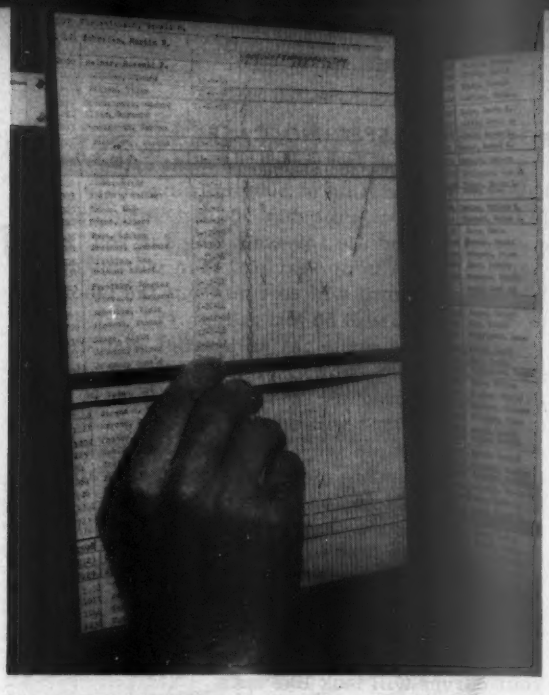
. . . help us get the right worker on the right job fast. They are key tools in putting skills to best possible use these skill-short days.

By JAMES EASLAND • Industrial Relations Manager
The Trane Company, La Crosse, Wis.

IT USED TO BE a major bottleneck for us to fill every job requisition. Transferring employees to meet varying job needs in our plants was a constant problem. Every time we got a request to supply a department with a worker having a particular skill, we had to spend from one to eight hours hunting through our personnel files. If a name-by-name search through all 1300 worker records failed to show up the needed skill, we could then hire a new employee.

Sometimes production of important orders had to be delayed while we scoured up the needed workers. And the works superintendent wasted a lot of time following up departmental requests, since all requisitions had to be channeled through his office.

Now we're using a manpower control system that gets us out from under these bothersome burdens. With the new system (working about six months), we can check the work skills of everyone in a department (about 30 workers) in less than five minutes.



MANPOWER CONTROL CHART. There's one set up on a stand on every foreman's desk.

If the foreman can't find the skills he wants in his own department, he can get quick help from his assistant superintendent. The assistant superintendent has a manpower control set-up for the five or more departments under his supervision, varying up to 200 workers. He can check his charts for needed skills in about 15 minutes.

But, if we still haven't found the skills we need, it's easy to take the final step. Eight of our assistant superintendents have master charts, listing skills of every one of our 1300 workers. It's possible to check a master chart in less than an hour.

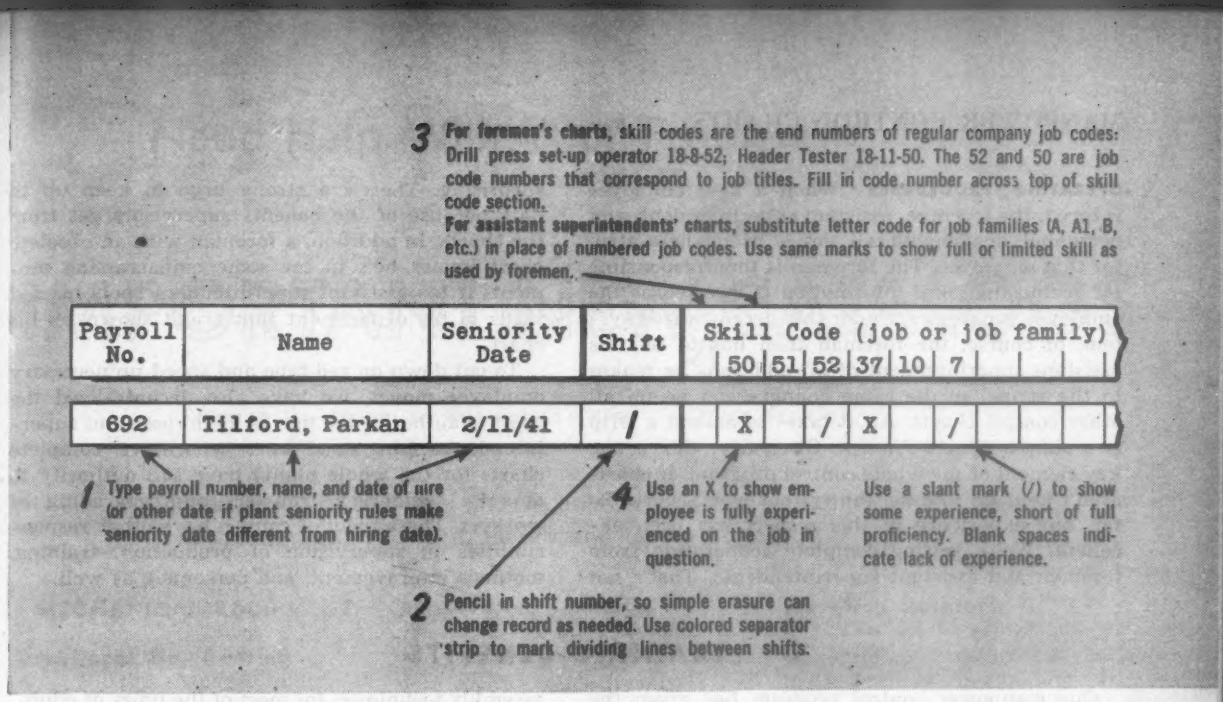
The way our plan is set up, the foreman's chart lists only skills likely to be needed in his own department. But on the assistant superintendent's charts we have a condensed listing of all skills—experience that may have been gained in 10 or more years in various types of work all over the plant. This system simplifies the foreman's job. Yet it gives higher-level supervision a wider picture of available skills.

HOW THE MANPOWER CONTROL PLAN WORKS

Our manpower control program includes three major elements:

JOB EVALUATION • We have evaluated all our jobs, using a variation of a well-known metal trades evaluation plan. There are 145 jobs, each with a good description. Everybody knows just what the jobs are, and the skills required. The evaluation was done jointly with the AFL federal labor union that represents our shop workers.

Jobs are coded, the last number in the code being the critical one for spotting skills. A typical code number looks like this: 1 - 8 - 2. The first number identifies the department in which the job exists. The second number tells the labor grade, which identifies the pay level for the job. And the


3 For foremen's charts, skill codes are the end numbers of regular company job codes: Drill press set-up operator 18-8-52; Header Tester 18-11-50. The 52 and 50 are job code numbers that correspond to job titles. Fill in code number across top of skill code section.
For assistant superintendents' charts, substitute letter code for job families (A, A1, B, etc.) in place of numbered job codes. Use same marks to show full or limited skill as used by foremen.
Payroll No.
Name
Seniority Date
Shift
Skill Code (job or job family)
50 51 52 37 10 7
692
Tilford, Parkan
2/11/41
/
X
/
X
/
1 Type payroll number, name, and date of hire (or other date if plant seniority rules make seniority date different from hiring date).
2 Pencil in shift number, so simple erasure can change record as needed. Use colored separator strip to mark dividing lines between shifts.
4 Use an X to show employee is fully experienced on the job in question.
Use a slant mark (/) to show some experience, short of full proficiency. Blank spaces indicate lack of experience.

HERE'S HOW TO MAKE IT. Instructions are simple, and use of cardboard strips makes the system flexible. Trane reports cost of installing it was small, and cost of maintaining it is almost zero.

third number—2 in this case—tells the type of skill, Grinder Operator. Similarly, punchpress operators are identified by the number 8, spotweld operator by 37, etc.

We have 145 job titles in all. There are relatively few of these in any one department, so the foreman can easily use the job code numbers as his "skill finders." But the job code numbers are too cumbersome when we have to check several departments, or even the whole plant. There are simply too many jobs.

To get around this trouble, we have worked out 21 "job families," or groups of jobs that are similar enough so the basic skills are readily transferable within the family. For example here are jobs in:

JOB FAMILY A-1, UNIT ASSEMBLY

JOB TITLE	DEPT.
Refrigeration Assembler, Class I	51
Assembler, Class I	22
" " "	23
" " "	28
Condenser Assembler	51
Lead Assembler	23
Assembler	37
Centravac Lead Assembler	37

For any one of the above jobs, assistant superintendents and the personnel department simply write down "A-1" instead of the regular job code number. This family designation gives an immediate picture of one general type of job skill possessed by a worker, without the complication of having to list the detailed information about the specific job. We thus end up with one code label for eight jobs, which makes it faster and easier to survey large groups.

It isn't absolutely necessary to have a job evaluation plan working to set up a manpower control program like ours. But it certainly makes it a lot easier to have all jobs systematically lined up in the order of their relative worth. At any rate, the least that you need for a manpower control system is a set of accurate job descriptions and job titles, so you're sure you're talking about the same jobs all over the plant. It's also important to think about "skills" in the broad sense of the complete job. There's not much point in thinking of skills narrowly, like skill in blueprint reading or sharpening tools. It's the whole job you want done.

MANPOWER CONTROL CHARTS • The control charts (see picture, page 136) are simply post-index boards into which narrow strips of cardboard can be inserted. The strips contain basic information about the employee (payroll number, name, seniority date, shift), plus spaces for indicating skills by use of a simple code system. Every foreman and assistant superintendent in the plant has one of these control charts on a stand right in front of him on his desk. Complete charts for all workers are on the desks of eight assistant superintendents, and in the personnel department.

Filling out the information on the tabs is quite simple. The instructions for doing this are given in the example above. Anyone who follows these instructions can make a set of charts without trouble, provided he has proper job descriptions and titles to start with.

More on next page

OPERATING PROCEDURES • When a new employee is hired, the foreman, assistant superintendent, and personnel department all get a brand-new strip for that employee. The foreman is then responsible for seeing that skill information is inserted as the employee progresses. Under this decentralized system, of course, the foreman then has to tell his assistant superintendent of all additions he makes to the strips, so the same changes can be on all other control charts. All it takes to amend a strip is a simple penciled mark. Obviously, this is the key element of the whole control program. If charts aren't kept up to date, the system won't work. So far, our experience in this respect has been excellent. We're getting complete cooperation from foremen and assistant superintendents. That's not surprising. There's a strong urge to keep up to date because of the benefits supervisors get from the charts. In addition, a foreman with an obsolete chart knows he's in for some embarrassing moments if his assistant superintendent spots needed skills in his department that aren't shown on his chart.

To cut down on red tape and speed up necessary employee moves, we have also decentralized the right to authorize the moves. Eight assistant superintendents (the same ones who have complete charts for the whole plant) have full authority to approve temporary transfers and upgrading of workers. These men, of course, have other responsibilities in supervision of production, training, methods improvement, and personnel, as well.

TRAINING BENEFITS

Our manpower control program has given the employee training program a real shot in the arm that's been of great help.

Foremen are responsible for on-the-job training, and for following up to see that employees master more than one skill. For example, a man who has done punchpress work for a year should have made some progress toward punchpress set-up work. Or an assembler should be familiar with the assembly techniques for most of the types of equipment made in his department.

If a manpower control chart doesn't show that a worker with a year or more of seniority has at least partial proficiency in more than one skill, the foreman may have been lax in his training duty. Since these skills are also shown on the assistant superintendent's chart, it's easy to spot training weaknesses in a department.

FLEXIBILITY BENEFITS

Our production picture is keynoted by the need for flexibility. We need an easily tapped reservoir of trained workers to fill the requirements of a constantly changing and complex production job. Rapid shift from one type and size of product is the rule rather than the exception at our main La Crosse plants.

For example, our Climate Changers (for air conditioning of large buildings) are assembled from standard components. But often they are tailored to meet customer specifications. So we have a situation where output of standard, semi-standard, and non-standard equipment is produced in long and short runs.

Our engineers have developed a happy marriage of job shop operation with line production techniques to cope with this problem. But this means that we have also had to have versatile workers, with a variety of related (or even unrelated) skills at their command. That's where the manpower control program has helped us greatly to solve our production problems.

Here's how:

There are a large number of workers in the plant who, at their own request, or by upgrading, have been transferred to jobs requiring completely different skills. Moves like this have been going on for a good many years.

For example, a welder likes the job of stockroom clerk. The way our labor contract reads, he can have that job if he wants it, provided his seniority is great enough and the job is open. Ordinarily the original skill (welding) would probably have become buried in our personnel files. That man would be passed over in an emergency requiring completion of a rush order involving a large amount of welding.

But, with the manpower control charts as a guide, this stockroom clerk's welding skill is still alive on the record for all to see, no matter how long the skill has lain dormant. In an emergency, this former welder, and all others, could be swept into the breach by means of temporary transfers. Most important, the moves could be made in a matter of minutes if the need were great enough.

All in all, we feel we have a more flexible and versatile work force than ever before as the result of the manpower control plan. It's a more stable work force, too. Our monthly labor turnover runs just over 2%. And our production costs are down because delays due to lack of skilled help are practically a thing of the past.

Need Help With Your Problem?

IMPORTANT NEW Free CATALOGS

... they're the cream of this month's crop ... they describe the latest methods and equipment.

Tell us which ones you want. Use the handy coupon at the bottom of the page. If somebody beat you to it, there's another on page 330.

MECHANICAL EQUIPMENT

Fractional Hp. Gearing

1 In this 6-page folder, 15 photos show a few of the many different types of fractional horsepower gearing made by this company. Tables, formulas, for diametral and circular pitch. Gear Specialties, Inc.

Steam Generator

2 Gives installation and operating advantages of packaged steam generators—one unit includes boiler, burner, firebox, insulation and jacket, piping, etc. Drawings and photos show construction and operation. Available in ratings from 15 hp. up. York-Shipley, Inc.

Evaporative Cooler

3 This 10-page catalog describes evaporative coolers for cooling quench oils, other liquids, in a closed system. Describes complete applications of unit, includes diagrams of several control systems, tells how to select correct unit for your application, gives complete mechanical specifications. The Trane Co.

Hand Tools

4 Over 4000 tools are listed in this 104-pager. Illustrates various kinds of wrenches, punches, chisels, pliers, tool boxes, etc. Complete specifications. Index makes it easy to find the tool you need for a particular job. Snap-on Tools Corp.

Vibration Isolators

5 This folder shows how vibration isolators cut costs in machinery installation and maintenance by maintaining accuracy of machine settings and by reducing operator fatigue. Set-ups pictured; installation instructions. The Barry Corp.

CLEANING EQUIPMENT

Power Sweeper

6 Catalog sheet illustrates power sweepers that vacuum as they sweep, do not raise dust. Sweepers have 16 heavy-duty brushes, can handle jobs in the shop or in the yard. Available in 36- or 48-in. models (width of sweep). Complete specifications included. Wilshire Power Sweeper Co.

Blast Cleaner

7 This 22-page booklet describes blast cleaner for metal, concrete, brick, stone, or wood surfaces. As it cleans, vacuum pick-up removes abrasives and other debris. Diagrams show how it works, many photos of units in operation. Vacu-Blast Co., Inc.

DUPLICATE COUPON ON PAGE 330

MAIL THIS COUPON FOR FREE CATALOGS *(Good until Dec. 31, 1951)*

FACTORY MANAGEMENT & MAINTENANCE (October, 1951)
330 W. 42nd St., New York 18

I'm circling the numbers of the catalogs and bulletins I want:

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49	50	51	

NAME ..... TITLE .....

COMPANY .....

STREET ADDRESS .....

CITY ..... ZONE ..... STATE .....

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JOE'S DEPARTMENT

FOR BETTER ELECTRICAL SERVICE

By JOE ST. ANDRE • Electrical Editor, FACTORY

ELECTRICIANS GETTING SCARCE— ARE YOU MAKING YOUR OWN?

"Where do you get your electricians?" I asked an electrical superintendent the other day.

"To tell you the truth, Joe," he answered, "we hope to steal them from other industries here."

I wonder how many plant managements are figuring on doing the same thing. If *you* are, look out. There are several good reasons why the old system of luring them away from someone else may not work too long:

1. More and more production machines have complicated electrical equipment on them. So the over-all demand for electricians is rising. One of these days we're going to realize the supply is terribly short.

2. The spread of pensions and union seniority rules makes it tougher to get a man to leave a plant where he's been working for several years. It isn't very attractive for him to go to the bottom of your seniority list.

3. Wage regulations make it tough for most plants to offer large pay lures.

So what *do* you do to get electricians? The answer is to *make* them—by a good training program. *If you don't have one, better check into ways to get one started.*

PAINT ON THE BUS-BAR BOLTS! WHAT FOR?

That's what I asked a plant electrician last month as I was visiting a steel mill. He was painting the bolts of the heavy bus bars of a plating machine. "Looks pretty," I said.

"Ain't paintin' 'em to make 'em look pretty," he replied. "Doin' it so I can spot trouble early—before it gets serious. If a bolt loosens up and I get a poor connection, the paint'll discolor. Easy to see, so we catch it early."

Now that's real preventive maintenance in action.

HOW TO MAKE YOUR PRESIDENT HAPPY ABOUT HIS OFFICE LIGHTING.

No fooling, a big headache for many a plant's electrical department is trying to light the offices of the "high brass." It isn't a question of just getting efficient lighting. That would be easy. It's a question of satisfying the whims of the men in the boardroom, the president's office, the general manager's office.

Maybe there aren't any executive offices in your plant. Or maybe the big shots in your company are unusual—they think the only job of office lighting is to help them see well. If so, then you can pat yourself on the back and move on to the next item.

But maybe you're not so lucky. As plant manager, plant engineer, or chief electrician, you're bothered by the time and effort spent—in vain—trying to please the "brass." You and your electricians could be using that time giving your plant better electrical service.

Then I have a suggestion that I think may help you. But first, let's see if your headache matches . . .

. . . Some Typical Aspects of the Problem

Suppose your boss wants plenty of light without a light source — indirect lighting the way it was in that New York nightclub. Fact is, he could barely make out the figures on his dinner check. Doesn't matter. He is sure that with a little stronger light he will get just the kind of illumination he wants.

So you make the mistake of suggesting that, if he must have indirect lighting, the color scheme of the walls and ceiling should be changed to something brighter. You learn that the color was picked out by his wife. You're married yourself, so you drop *that* suggestion right away. Then you suggest direct lighting.

Now, *that's* the answer. So you get lighting engineers in to tell you what to do. The first thing that meets their eyes is the highly polished desk top right in the center of the room. Or—even worse—a glass top polished every day by the head janitor. Not even a finger mark to assist the lighting engineer.

"That must go," say the engineers.

"You don't know my boss," says you. "How can he be an executive without a mahogany desk or a glass top? You think he'd settle for a desk top of linoleum with a reflection factor of approximately 35%? That's too easy a way to cut down glare on desk tops. It's for junior executives."

So you try this fixture and that fixture until either the boss gives in, or by some strange run of luck you get something that really pleases him. That something, however, may be the last thing you might think of.

I remember, when I was a chief electrician, spending a couple of weeks searching throughout

Exide-Ironclad
BATTERIES
ARE YOUR BEST POWER BUY— AT ANY PRICE

They ASSURE high maneuverability of trucks ... rapid, accurate handling of material ... PROVIDE uniform rate of material handling with no unscheduled down time ... SHOW lowest costs of operation, maintenance, repair, depreciation, inherently safe. Call in an Exide Representative, and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" *Reg. Trade-mark U.S. Pat. Off.*

JOE'S DEPARTMENT

Begins on page 140

dozens of fixture companies trying to find a fixture that would suit my general manager. Finally, I got him to come down to look at one particular fixture that I thought would please him. It didn't, but he *did* see one that would. That fixture had been thrown out of schoolrooms years before. But that was the one we installed over his desk, and I went back to my job of making the plant run.

These are just some of the troubles you can have. But here's . . .

. . . A Way Out of Your Dilemma

Lately I've seen the display rooms of some manufacturers of lamps and fixtures. I hadn't realized it before, but they're ideal places to take the big boss. He can select the fixtures and types of lighting he wants.

And he can see the color schemes recommended to go with them. Suppose he balks at these. The better display rooms have examples of bad color-and-furniture combinations, so the boss can see how his whims ruin the lighting.

Suppose he's a lot-of-light fan. I've seen a display office with 150 to 200 foot-candles of light that was perfectly comfortable to the eyes. But the walls, ceiling, and furniture had to be right.

Display rooms show how indirect lighting *can* be made to work. And if you want to interest the boss in the latest thing, he can see how mixed colors in lighting make for comfortable seeing.

The point is: *Get the boss to the display room and get the whole matter of lighting and decoration straightened out there, once and for all.*

HERE'S A TIP ON ELECTRICAL SAFETY

Everyone in your electrical crew should know how to handle the man who gets hold of a hot wire. They should all be adept at the Schafer prone-pressure method of resuscitation. (*Get in touch with the Red Cross. They'll tell you where to find a teacher.*)

In my department, all the men knew this way to get a man breathing again. And they knew their foreman and I knew it, too. I put a foreman in charge of safety education, and he set up regular practice and refresher sessions.

It took a bit of selling to get the men interested. The approach that worked for me was to keep telling the men something like this:

"I'm interested in knowing that you know how to take care of me in case I get hung up some day on an electrical circuit. Remember, the life *you* save may be *mine*."

At first the men took it as a joke, but before long they realized we weren't fooling. Then it wasn't hard to sell the idea that "the life *we* save may be *yours*."

LITTLE PLANTS CAN HAVE ELECTRICAL SAVVY, TOO

Big plants aren't the only ones with know-how in electrical maintenance. It is sometimes surprising what a good two- or three-man electrical crew can do.

For instance, I recently visited the United Board & Carton Corporation's paperboard mill in Thomson, N. Y. I saw a 1500-kw. main sub-station with its associated high-voltage switching structure and low-voltage switchgear. This job was done by Bob Forbes, the plant electrician, and two helpers. With very little modern equipment, he put up a station comparable in workmanship to the jobs done by the large contractors in the big cities.

One look at his generating room and you realize he knows how to maintain equipment as well as install it. He proves that good electrical maintenance *can* be done in small plants.

HERE'S A SMART INVESTMENT OF ELECTRICAL FOREMAN'S TIME

Are you building — or planning to build — a new plant or addition? Then it will pay you to have your electrical supervisor on the scene during the construction period.

That's the time for him to become fully familiar with the underground system, the power distribution layout, etc. He'll learn a lot that will be a big help when trouble-shooting time comes.

Maybe it seems silly to spend your operating department's money on his salary before the new plant gets into operation. Don't worry, you'll get your money back many times over when the new plant has its first breakdown. There's no substitute for seeing the electrical services actually go in.

Remember, power breakdowns cost you dearly in these days of automatic machinery. A good insurance premium against future tie-ups is to get your electrical foreman out at the new plant long before the contractor turns the key over to you.

THREE KINDS OF POWER IN ONE PLANT

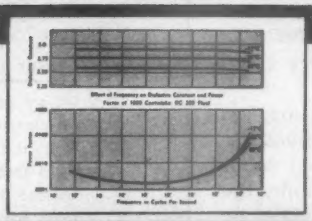
So *you* think *you* got it tough? But how would you like it if you had to live with power in two or more frequencies? That's the sad lot of some of our good friends in Canada. I met an electrical engineer on my last trip up there who's already taking in power at 25 cycles and 66 2/3 cycles. And now his plant is putting in a new substation that will get 60-cycle power! *How d'ya like that?*

DOW CORNING SILICONES

Heat-Stable, Moisture-Proof SILICONE DIELECTRIC MATERIALS are available in the following forms:

LIQUID DIELECTRICS

DOW CORNING 200 FLUIDS are a series of clear, inert liquids, notable for their thermal stability and for their remarkably flat viscosity-temperature slopes. Available in viscosities from 0.65 to 1,000,000 centistokes. Pour points range from −123° to −47°F. and flash points range from 30° to 600°F. Low dissipation factors at elevated temperatures or at high frequencies, inertness to moisture, oxidation resistance and heat stability make Dow Corning 200 Fluids unique among liquid dielectrics.



As indicated by these curves, neither frequency nor temperature changes have any pronounced effect on the power factors or dielectric constants of Dow Corning 200 Fluids. Power factor and dielectric constant of 1000 cs. fluid at −17°, 23°, and 83° C. are plotted against frequencies ranging from 10 to 10^{10} cycles per second.

DIELECTRIC COMPOUND

DOW CORNING 4 COMPOUND is a nonmelting water-repellent dielectric paste which retains its grease-like consistency at temperatures from −70° to 400°F. It is highly resistant to oxidation and to deterioration caused by corona discharge. Power factor is less than 0.003 at frequencies up to 10,000 megacycles; volume resistivity is more than 10^{12} ohm centimeters at temperatures up to 400°F.; dielectric strength is more than 500 volts per mil at a 10 mil gap. Dow Corning 4 meets all requirements of Specification AN-C-128a.

Dow Corning 4 packed in phonograph pick-up head cartridges increased crystal service life 20 times. The silicone compound prevents Rochelle Crystals from deteriorating due to absorbed moisture. It also acts as a viscous damping medium, thereby reducing excess vibration and enabling the head to handle a much higher frequency.

ELECTRICAL INSULATING VARNISHES

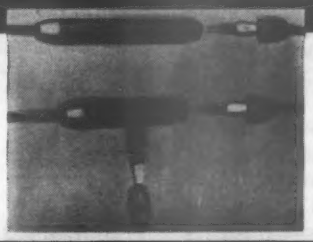
DOW CORNING 996 VARNISH dries tack-free in not more than 3 hours at 150°C. Dielectric strength measured with 2 inch electrodes on 2 mil films baked for 16 hours at 150°C. is 1000-2000 volts/mil, dry, and 500-1500 volts/mil, wet. Heat flexibility is more than 100 hours at 250°C. Cured films have good resistance to dilute acids, concentrated hydrochloric acid, and dilute or concentrated alkalies.

Flashover in high voltage television power supply coils can set ordinary organic varnish aflame. To eliminate this fire hazard, coils are impregnated with Dow Corning 996. Highly resistant to arcing, 996 provides positive protection against carbon tracking for the life of the entire set.

SILASTIC *, THE DOW CORNING SILICONE RUBBER

Silastic combines the remarkable heat stability and moisture resistance of resinous silicones with the physical properties of rubber, including resilience, shock and abrasion resistance, and resistance to both mechanical and electrical fatigue. Its dielectric properties show little change over a wide range of frequencies, even after aging at high temperatures. The surface resistivity of Silastic is high, and its thermal conductivity is about twice as great as that of either organic rubber or resinous insulating materials.

*T.M. REG. U.S. PAT. OFF.



Completely eliminating taped connections on aircraft antennae, white Silastic seals reduce static and corona discharge by as much as 90%. They retain their resilience as well as their dielectric properties, excluding moisture and foreign matter after long exposure to the full range of ground and stratospheric temperatures.

SILICONE-GLASS LAMINATES

DOW CORNING THERMOSETTING RESINS are used to bond inorganic fabrics and finely divided particles such as powdered metals or mica. Typical ⅛" silicone-glass laminates have a flexural strength of 22,000 to 45,000 psi; water absorption after 24 hours of 0.25 %; dielectric strength with continuous filament cloth of 250 volts/mil or more; power factor of 0.002 at 1 mc; loss factor of 0.007 at 1 mc; wet insulation resistance of more than 10^{12} ohms; arc resistance of 300 seconds and a heat distortion value above 250°C.

For maximum dependability and long service life, silicone-glass terminal blocks and contactor bases are being used in late model automatic toasters. Tests prove that Dow Corning silicone resin bonded glass laminates are more rigid, more heat-stable, more resistant to moisture and easier to fabricate and assemble than conventional materials.

MAIL THIS COUPON TODAY!

DOW CORNING CORPORATION, DEPARTMENT L-10, MIDLAND, MICHIGAN

Please send me full information on the subjects checked:

☐ Dow Corning 200 Fluids ☐ Dow Corning 4 Compound ☐ Dow Corning Electrical Insulating Varnishes ☐ Silastic ☐ Dow Corning Silicone-Glass Laminates ☐ Reference Guide to Dow Corning Silicones

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FIRST IN SILICONES
DOW CORNING CORPORATION
MIDLAND, MICHIGAN

New Way to Load Indirect Labor

By JAMES F. GORMELEY
Cost Engineering Department
Bigelow-Sanford Carpet Company, Inc.
Thompsonville, Conn.

HOW MANY MEN do you assign to an indirect labor job at any given volume of production, and for a given product mix?

For a long time that question was one of the big stumbling blocks to adequate control of indirect labor costs at Bigelow. We think the rather simple system highlighted by the tables at the right now has the problem pretty well licked.

This system prevents assigning too many men to a job by giving us a clear picture of the standard work load. Equally important, it prevents a drop in quality result from putting too big a load on too few men.

Helps Conserve Manpower

An added advantage of this system is that it points up possibilities of reducing manpower through consolidation of duties. Look, for example, at Schedule A of the table at the lower right. On the basis of individual assignments, 7 men are required. On a consolidated basis, we would need 6.124 men on a 40-hr. week. This suggests that, with reasonable performance, the job could be done by 6 men.

Schedule B is an even more clear-cut case. Spool stripping and bobbin setting, combined, require 4.816 men—actually 5. Yet, on an individual basis, 3 men are needed for each operation—a total of 6. More than a suggestion, this is positive evidence of the ability to do the job with 5 men instead of 6 by combining duties.

Of course, when you start combining operations, you have to be ready to make check-studies on possible "interference." In some cases, certain operations may have to be performed simultaneously. By checking the frequency of this inference, you can adjust the standard, re-examine it to see if the combination is still a man-saver.

FIRST we listed all jobs involved in servicing spinning mules. For each job, we timed all possible work elements for each of the five grades of yarn used. We corrected element times for frequency of occurrence, as below . . .

OCCUPATION: YARN WEIGHER AND RECORDER

UNIT: 1000 DRAWS

YARN GRADE: B

ELEMENT DESCRIPTION	ELEMENT TIME	OCCURRENCE PER UNIT	ALLOWED MINS./UNIT
Get and position truck at mule	.250	1/775	.322
Fill truck with bobbins	.720	1/258	2.791
Transport truck to scale	.150	1/775	.194
Weigh truck and record weight	.310	1/775	.400
Transport truck to storage	.600	1/775	774
Weigh and note tare weight of truck	.150	1/775	.194
Sweep floor, bale and dispose of waste	2.560	1/1000	2.560
Total minutes			7.235
Allowances—personal, fatigue, and unavoidable delays 15%			1.085
Standard min./1000 draws			8.320
Standard hrs./1000 draws			.139

THEN we combined the allowed times for each job on each grade of yarn. The single table shown below gives us all the information we need to set standards for any product mix . . .

YARN GRADE	STANDARD HOURS PER 1000 DRAWS			
	YARN WEIGHER	ROVING CARRIER	SPOOL STRIPPER	BOBBIN SETTER
Grade A	.181	.047	.152	.143
Grade B	.139	.092	.146	.132
Grade C	.212	.107	.174	.151
Grade D	.191	.103	.168	.147
Grade E	.201	.105	.172	.149

EACH WEEK we take the number of scheduled draws of each yarn grade for the week and multiply by the standards in the table above. This tells us the number of men we must assign to that operation for the week to avoid over- or under-loading . . .

SCHEDULE A

YARN GRADE	SCHEDULED DRAWS/WEEK	MAN-HOURS PER WEEK REQUIRED			
		YARN WEIGHER	ROVING CARRIER	SPOOL STRIPPER	BOBBIN SETTER
Grade A	134,000	24.254	12.998	20.368	19.162
Grade B	68,700	9.549	6.320	10.030	9.068
Grade C	109,000	23.108	11.663	18.966	16.459
Grade D	76,000	14.516	7.828	12.768	11.172
Grade E	26,700	5.367	2.804	4.592	3.978
Total man-hours required		76.794	41.613	66.724	59.839
No. of men required (40 hr. wk.)		1.920	1.040	1.668	1.496
Total men required—7		2	1	2	2

SCHEDULE B

YARN GRADE	SCHEDULED DRAWS/WEEK	MAN-HOURS PER WEEK REQUIRED			
		YARN WEIGHER	ROVING CARRIER	SPOOL STRIPPER	BOBBIN SETTER
Grade A	278,000	50.318	26.966	42.256	39.754
Grade B	21,900	3.044	2.015	3.197	2.891
Grade C	164,000	34.768	17.548	28.536	24.764
Grade D	97,000	18.527	9.991	16.296	14.259
Grade E	64,500	12.965	6.773	11.094	9.611
Total man-hours required		119.622	63.293	101.379	91.279
No. of men required (40 hr. wk.)		2.990	1.582	2.534	2.282
Total men required—11		3	2	3	3

DESIGNED AND MANUFACTURED BY THE WORLD'S LARGEST USER OF WELDING AS A PRODUCTION TOOL

A.O.Smith D-C WELDER

Available in 200-, 300- and 400-amp. models

★ **Field-Proven SUPERIORITY**

★ **Heavy-Duty Precision Construction**

★ **D-C Welding at Lower Cost**

In this new A. O. Smith welding machine you get higher efficiency at lower initial cost and reduced maintenance by comparison with motor generator sets.

The A. O. Smith D-C rectifier-type welder stands up under heavy service because it is *properly cooled* by high-velocity, directed down-draft ventilation. No overheating of selenium stacks is possible in regular heavy-duty service.

The three-phase coils in the A-C circuit are of heavy copper and precision layer-wound, providing full NEMA-rated output with minimum line load. Amperage control in stepless stages is effortless . . . *ball-bearing jacks* smoothly raise and lower the primary coils.

A sturdy, weather-proof case provides complete protection from weather and dust, in shop or out.

Ask your A. O. Smith distributor, listed below, to demonstrate . . . or write direct for information.

A. O. Smith Corporation
Welding Products Division, Dept. FM-1051
Milwaukee 1, Wisconsin

77th ANNIVERSARY 1874 - 1951

A.O.Smith
WELDING PRODUCTS
Made by Welders . . . for Welders

Ask the A. O. Smith Welder Distributor Near You for a Demonstration

Pacific Metals Co.
Los Angeles, California

Pacific Metals Co.
San Diego, California

Pacific Metals Co.
San Francisco, California

Western Oxygen Co.
Denver, Colorado

Dixie Gases, Inc.
Atlanta, Georgia

U. S. Steel Supply Co.
Chicago, Illinois

Universal Welding Supply Co.
Chicago, Illinois

H. R. McGarvey
Pekin, Illinois

Minewold Co. of Indiana
Indianapolis, Indiana

Acme Welding Supply Co.
Louisville, Kentucky

U. S. Steel Supply Co.
Baltimore, Maryland

U. S. Steel Supply Co.
Allston, Massachusetts

LaSalle Electric & Mill Supply Co.
Detroit, Michigan

Welding Gas & Supply Co.
Grand Rapids, Michigan

Jackson Welding Supply Co.
Jackson, Michigan

Wolverine Gas Products
Saginaw, Michigan

U. S. Steel Supply Co.
St. Paul, Minnesota

U. S. Steel Supply Co.
St. Louis, Missouri

U. S. Steel Supply Co.
Newark, New Jersey

Dixie Gases, Inc.
Charlotte, North Carolina

Queen City Supply Co.
Cincinnati, Ohio

Welding & Cutting Supply Co.
Cleveland, Ohio

Ross-Willoughby Co.
Columbus, Ohio

El Paso Welding Supply Co.
El Paso, Texas

Dye Welding Supply Co.
Houston, Texas

Pacific Metals Co.
Salt Lake City, Utah

McJunkin Supply Co.
Charleston, West Virginia

Holt Electric Motor Company
Milwaukee, Wisconsin

U. S. Steel Supply Co.
Milwaukee, Wisconsin

REQUEST FOR APPROPRIATION

DATE May 15 1951 NO. 987

1. DESCRIPTION OF WORK TO BE DONE

Purchase and install one new 1000-lb. electric hoist for use at the Gunite finishing department.

2. ESTIMATED COST OF LABOR BY GUNITE

Installation-
Electrical department

TOTAL $8.00

3. ESTIMATED COST OF MATERIAL BY GUNITE

Wire and miscellaneous fittings

TOTAL $3.50

4. ESTIMATED COST OF OUTSIDE WORK OR EQUIPMENT

1-1000-lb. electric hoist $209.00
2% tax 4.18

TOTAL $213.18

TOTAL ESTIMATED COST $224.68

5. WORK REQUESTED BY:
DEPARTMENT: Gunite finishing SUPERVISOR

6. BENEFITS OR SAVINGS RESULTING FROM INSTALLATION:

Hoist will be used to handle castings from skids to workbench, thereby reducing the manual handling. At present the man works an average of 275 castings per day. It is estimated that with the use of the hoist he can do 325 castings per day.

APPROVED BY:
Chief Engr.
Supt. 5-14-51
Gen'l Mgr.
Treas.
Date Approved

ONE FORM

Controls All Plant Improvements

IT'S THE "Request for Appropriation" you see above. Management at Gunite Foundries Corporation, Rockford, Ill., uses it to control *all* capital expenditures and major replacements. This includes alterations for changes in production methods.

Here's what the form does:

1. Keeps management posted on plant engineer's spending.

2. Helps plant engineer present all the facts needed for appraisal of the idea and justification of the expense.

3. Makes it easier for management to decide what to do with the request.

4. Encourages flow of ideas.

These are reasons enough for making this form popular with all Gunite executives and operating heads. But Jerry Doherty, plant engineer, and Harold Propp, maintenance superintendent, probably like it the most. Theirs is the job of working up the data. They are now able to make out a complete case on one sheet of paper for every project any supervisor or department head needs or thinks will save the company money. By reducing each project to a formal procedure, this form insures a fair hearing for everyone.

A TYPICAL CASE · Tom Fedor, department head, wants a new hoist in one corner of his room. He's convinced it will make the job easier and speed up the flow of castings. So he talks it over with the plant engineer. They agree to develop a request for appropriation.

The six items on the front side of form are worked up as follows:

1. Description of work to be done. The plant engineer writes brief specifications of all engineering requirements after analyzing the job.

2. Estimated cost of labor by Gunite. Also developed by the plant engineer. He leans heavily on the maintenance superintendent for accurate figures.

3. Estimated cost of material by Gunite. Here, too, the plant engineer collaborates with the maintenance superintendent. They share the same office, which makes consultation easier.

4. Estimated cost of outside work or equipment. It's up to the plant engineer to get these figures, if needed.

5. Work requested by. Obviously, the supervisor asking for the job.

6. Benefits or savings. Here is the payoff. The plant engineer develops these data by investigating all economic facts. He cannot always cite tangible money savings. But he knows that intangibles—such as better working conditions, safety, ability to meet production schedules, or fewer breakdowns—also carry weight.

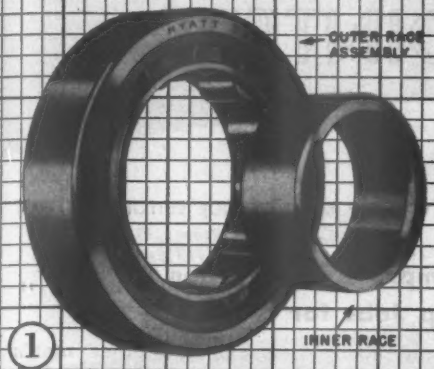
The form now goes to management for approval.

CHECKING THE COST · This is important, too. When management decisions are based on savings *versus* installation costs, they might be invalid later if the actual cost overshoots the estimate. At Gunite the secretary and treasurer get cost reports of every completed job. If there has been a substantial overage or underage in total cost, an explanation by the plant engineer must go with it.

The other side of the request shown above is used for collecting all cost data. The labor items are entered daily by the maintenance clerk. Material costs are summarized from stock requisitions and purchase orders.

Cost *facts* can thus be quickly checked against cost *estimates*.

Versatility when you need it— HYATT HY-LOADS



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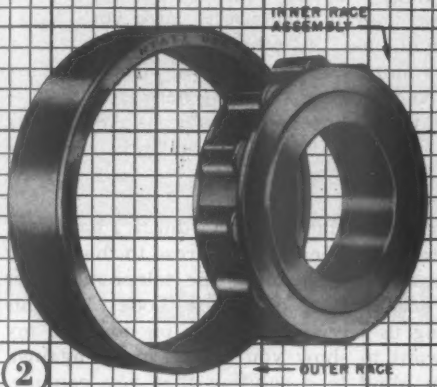

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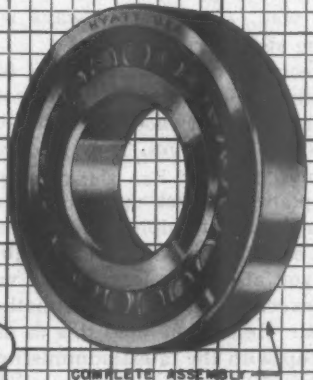


3

WHEN you are faced with the problem of providing the largest possible shaft diameter for a given bearing or the smallest possible housing, reach for a Hyatt catalog.

1 If design requirements are such that a larger shaft diameter is desirable to produce greater rigidity without disturbing boundary dimensions, a separable inner race type Hyatt Hy-Load bearing can be used with the inner race omitted. The rollers then operate directly on a suitably hardened and ground shaft.

2 When the housing bore must be kept to a minimum, a separable outer race bearing can be used with the outer race omitted. The rollers then operate directly in a housing bore of suitable hardness and finish.

3 If the design requires that the bearing be installed as a unit Hyatt also provides non-separable types of Hy-Load bearings.

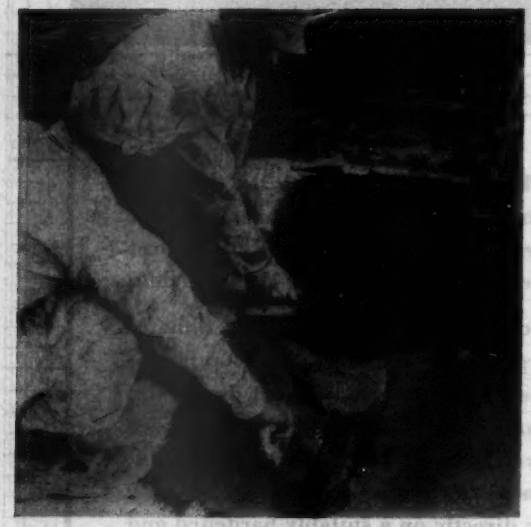
All three types of Hyatt Hy-Load Bearings are available in a wide variety of cage, race flange and snap ring arrangements and in a wide range of sizes. For a complete explanation, write for our catalog No. 547. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

MAINTENANCE POINTERS

FOR PLANT [illegible]TING EXECUTIVES

By CARL G. WYDER • MAINTENANCE EDITOR, FACTORY



Neoprene-cement overlay may be the answer . . .

. . . When Workers Complain Floors Are Hard on Their Feet

Here's a new wrinkle in plant floors—rubberized cement. It's been tried out in one woodworking shop for over two years, and has kept the workers foot-happy.

The floor is easy to lay. You mix a special water-setting cement with some specially compounded neoprene rubber latex and sand aggregate. You can add whatever color you want. Then you trowel the mixture to a smooth finish about a quarter-inch thick over your old floor —whether it's concrete, wood-block or steel plate. The floor is ready for traffic in two days —a normal week end.

All the workers claim this thin rubberized overlay really makes a difference in foot comfort.

The floor has shown good non-skid qualities, too, especially noticeable, as against the old floor, when oil or water has been spilled. The material has stood up well under heavy traffic. It hasn't worn through anywhere, nor has it chipped, cracked, or come loose from the old floor. Oil drip from machines hasn't bothered it. Crossfield Products Company, 71 Union St., Elizabeth, N. J., can tell you some more nice things about this floor, and furnish the special materials.

To Improve Your Vision, Swap Jobs for a Day

We're talking about vision of the other man's problems — the department head who acts as though you have no other jobs to do but those in his bailiwick. Or the plant engineer who gets under your skin because he's always got an excuse for not scheduling a Johnny-on-the-spot repair.

Of course, you're each pretty sure your judgment is right, and the other guy is dead wrong. When, as a matter of fact, both of you are trying to do a good job. What's lacking here is an understanding of the other fellow's problems. And I think the plant engineer, since he's usually in a service capacity, can make the first move to clear the atmosphere.

Here's how one plant engineer did it. I happened to be in his office when an issue rose to the boiling point. I heard him say over the telephone, after a heated exchange of opinions, "Look, Joe, this isn't getting us anywhere. Come on down to my office. I want to show you what I'm up against. Maybe I'm blind to a solution that you can see. If you can help me and yourself at the same time, I'll be grateful for it."

Takes a big man to talk like that. Joe came down, sort of blustery at first. But he soon calmed down when he saw the plant engineer was sincere. And he learned there was — as there always is — another side to the story.

To improve executive cooperation, some companies — all too few — practice the "mayor-for-a-day" techinque among their executives. Best way to do it is with junior executives. They are growing up, and have more time.

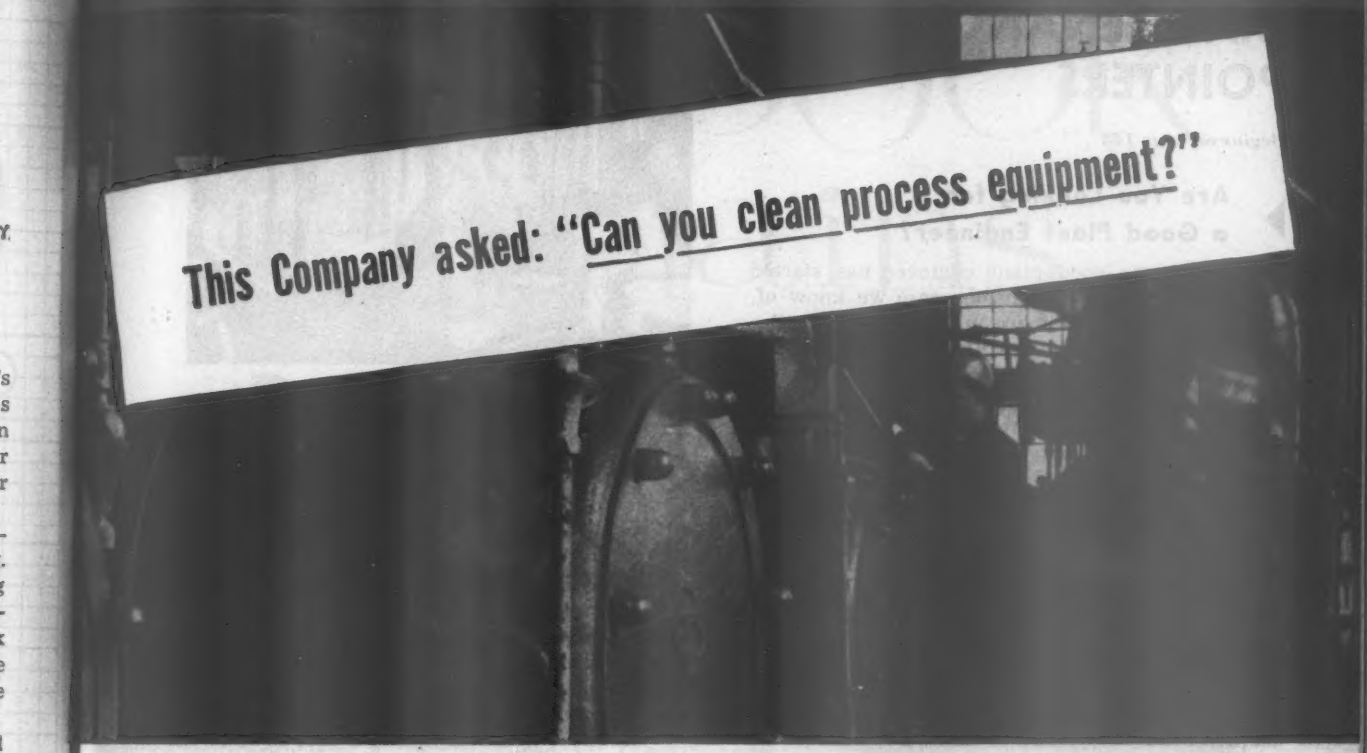
You say your plant isn't set up for that sort of thing? If you agree in principle, what's to stop you from going it alone? This same plant engineer I've been telling you about has learned the value of inviting other executives to check his methods, at least once a year. He says he does this to make sure he's keeping up with the latest administrative wrinkles. I wonder if he isn't subtly creating an understanding of his problems at the same time?

Understanding breeds cooperation. How much easier would your job be if you had better cooperation from your co-executives? A serious answer to that question will prove it's worth your while.

More on page 150

DOWELL SERVICE

CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS



Dowell Service cleaned *THREE* cooling jackets in 7 hours!

In a manufacturing plant, the cooling efficiency of water jackets on three air compressors was lowered by an accumulation of deposits. *Without interrupting operation of the compressors,* Dowell engineers cleaned the jackets in 7 hours. As a result of Dowell Service, the cooling on these compressors was increased 50°F. with one-third less water. Inter and after coolers were cleaned in the same operation.

This is just one example of effective Dowell Service. Similar results have been obtained on the heating and cooling jackets of many types of process equipment—such as reaction tanks, press molds, and rubber and plastic fabricating rolls and mixers.

Dowell furnishes trained personnel, pump trucks and control equipment. Dowell engineers apply liquid solvents according to the technique demanded by the job: for example, by filling, spraying, jetting, cascading or vaporizing. The solvents are specially prepared for each job and designed to dissolve and disintegrate deposits quickly. Dismantling is unnecessary and downtime is kept to a minimum.

With experience gained in thousands of jobs, Dowell engineers offer fast cleaning service on many different kinds of equipment in your plant. Call the nearest Dowell office today for your FREE consultation.

Other recent Dowell jobs:

Heat transfer efficiency of seven press platens used in rubber vulcanizing was lowered by accumulation of iron oxide deposits. In just 8 hours, Dowell Service restored the designed heat transfer rate and reduced operating costs.

•

The ammonia liquor cooling coils in a coke works became heavily encrusted. Dowell Service removed the deposits without interrupting operations. Result: A daily savings in coal and steam of $167.28.

•

A boiler was making only 12,000 lbs. of steam per ton of coal. After Dowell Service, production increased to 18,000 lbs. of steam per ton of coal . . . a 50% increase in efficiency.

DOWELL INCORPORATED • TULSA 1, OKLAHOMA

CALL

New York 20	Buffalo 2	Kansas City 8	Mt. Pleasant, Mich.
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Atlanta	Louisville	Anniston, Alabama	Lafayette, La.

Long Beach, Oakland, Casper: Dowell Associate—International Cementers, Inc.

★ *Maintenance cleaning service for industrial heat exchange equipment.*
★ *Chemical services for oil, gas and water wells.*
★ *Magnesium anodes for corrosion control.*

DOWELL

A Service Subsidiary of
THE DOW CHEMICAL COMPANY

MAINTENANCE POINTERS

Begins on page 148

Are You Looking for a Good Plant Engineer?

More than one good plant engineer has started elsewhere in the plant. In one case we know of, our man worked summers in the production department while attending college. He got an M.E. degree, then came back as a full-time production supervisor. After a stretch of several years all over the plant, he had acquired a good grasp of the production man's problems.

It was then he shifted over to the plant engineering side, at the plant manager's request, to help improve the maintenance set-up. The move was understood to be temporary. You can guess what happened. He did so well, the job became permanent. And later he became plant engineer.

This man probably would have made a good plant engineer had he never trudged the production road. But he humbly insists he's now a far better plant engineer because he had previously learned production men's attitudes and how to talk their language. To them, he's always one of them.

Phenolic Bearing Surfaces on Heavy Sliding Parts Eliminate Wear

One of the tough problems that plagued Pratt & Whitney, West Hartford, Conn., for years was the scoring and wear of iron-to-iron bearing slides from the constant movement of heavy masses. This abnormal wear caused such machines to lose accuracy.

By the use of phenolic liners, says P&W, it has licked the problem. It has fastened laminated phenolic plates, sliced edgewise for end-grain surface, to the slides of the column base, vertical slide, and spindle head of its large Keller milling machine. Plates are pinned securely with phenolic pins, and then planed and precision scraped to their metal mating slides, as before. Molded phenolic drive nuts are fitted to the various lead screws.

Exhaustive tests on this machine over a period of several years have shown that phenolic bearing surfaces against iron or steel will not cut or score either slides or lead screws. Also, proper lubrication should prolong the bearing life almost indefinitely. And the heat-insulating quality of phenolic liners helps high-speed operation. This machine runs at traverse speeds up to 250 inches per minute.

Tools are returned promptly because . . .

. . . Painting Tools Yellow Makes Them Hard to Lose

Did any of your maintenance men ever need a tool very badly that someone else had already checked out of the stockroom? And when you chased that someone down for it, he said he had turned it in when he finished the last job?

Well, he only thought he did, because you finally found it where he left it — out on the old job. He didn't see it when he cleaned up and so he didn't turn it in. It was still charged to him, of course. But your next man lost almost a half hour in the process of finding it.

That's just one of the things The Trane Company, La Crosse, Wis., avoids by painting all its maintenance equipment a bright yellow. This practice includes tools, hydraulic jacks, extension cords, pipe wrenches — even wheelbarrows.

When it comes to clean-up time, you can't miss seeing all the tools you brought to the job. And you cut down minutes in looking for them. If by rare chance you do miss one, everybody knows where a yellow tool belongs. Back it goes, automatically, to the maintenance stockroom.

Going to Have a Fire This Winter?

You may, if you don't service your plant for winter fire protection, Also if a freeze hits you beforehand, you're in for expensive repairs to fire protection equipment.

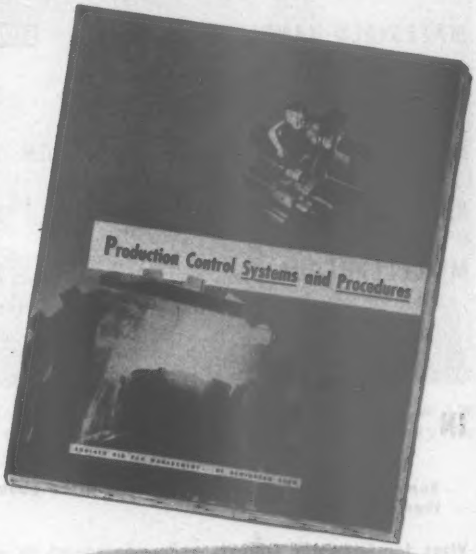
It's not too early now to plan what must be done. Any good plant engineer knows he has to think about heating systems, sprinkler and standpipe systems, water supplies, fire pumps, and hand extinguishers.

To make the job of planning easier, we suggest you get a self-inspection checksheet we saw the other day. Free, from the Rollins Burdick Hunter Company, 231 S. LaSalle St., Chicago.

Turn to page 276 for Good Ways to Solve Special Plant Engineering Problems

new book explains

Practical Production Control



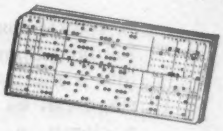
Most of your manufacturing problems today can be summed up in two words — *materials* and *production.*

The answer to these problems lies in simplified and proved paper work systems. That's why we know our new book, "Production Control Systems and Procedures," can be a standard guide to material and production planning and control in your plant, whether it is large or small.

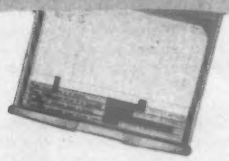
This book outlines actual case histories based on the vast combined experience of practical men who solved the complex production control problems of a regulated economy. These men now bring you, free, their analysis of simplified means for coordinating men, materials, and machines.

Here are a few of the practical ideas you will find in this book . . .

. . . How to keep up maximum output, curb costly production delays — by using SCHED-U-GRAPH CHART BOARDS to set up long-range, flexible production schedules, and to provide positive control of machine loads and parts needed for assembly-line operations.



. . . How to detail advance requirements of parts and raw materials for effective procurement action — with PUNCHED-CARD TABULATION SYSTEMS that "explode" bills of materials mechanically, quickly; and also provide the facts needed to prepare CMP allotment applications.



. . . How to maintain coordinated control of requirements, advance ordering, receipts and inventory of each item of parts and raw materials — in KARDEX VISIBLE CONTROL SYSTEMS that flash positive warning of threatened shortages or overstocks, so that prompt corrective action may be taken.

"Production Control Systems and Procedures", Form No. X1268, will show you how these proved ideas can help solve your production control problems. For your free copy, phone our nearest Business Equipment Center. Or write to Room 1402. Management Controls Reference Library, Remington Rand Inc., 315 Fourth Avenue, New York 10, N.Y.

Remington Rand

WHAT'S NEW IN EQUIPMENT... BRIEFED HERE

AUXILIARY EQUIPMENT 166

ELECTRICAL EQUIPMENT 176

LIGHTING 184

MAINTENANCE TOOLS & SUPPLIES 186

MATERIALS HANDLING ..... STARTS HERE

MEASURING & CONTROL 200

PLANT HOUSEKEEPING & SANITATION 202

SAFETY & PLANT PROTECTION 204

MISCELLANEOUS 206

IN THE NEXT ISSUE

Some notes on important late items. More about them next month.

Vises for Irregular Objects — Round, tapered, or irregular objects can be clamped tightly in this new vise without damaging the surface. Jaws consist of a series of flat plates which swivel to conform with shape of held object.
DeWilde-Jones, Inc., 181 Steuart St., San Francisco.

Automatic Control makes corrections in process variables that are proportional to the deviation from normal; largely eliminates over-correction and "hunting." Pilot lights indicate when process variable is within tolerance, too high, or too low.
Fielden Instrument Corp., 2920 N. Fourth St., Philadelphia 33.

Combination Tool Suspension and Air Hose Reel makes a compact unit for installation over the work bench. Pneumatic tool is suspended on hose supplying air; spring tension on hose balances weight of tool.
The Wayne Pump Co., Fort Wayne 4, Ind.

Combination Oil and Gas Burners are needed wherever gas is sold on interruptable or curtailable service. These units burn both oil and gas efficiently.
Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee.

Portable Vacuum Leak Locator — Weighs only 31 pounds and is simple enough to be operated by unskilled personnel.
RCA Victor, Camden, N. J.

AS A CLAMP OR FORK-SPACER, carriage handles drums with bare forks or clamp shoes. Fork-spacing also fits forks to different sizes of pallets.

Fork Carriage

A 4-WAY FORK CARRIAGE developed by the Baker-Raulang Company converts its standard fork truck into a multi-purpose handling machine. The carriage can be used in turn as a standard fork lift, a clamp, a fork-spacer, and a side-shifter. No extra attachments are needed, no tools required. The driver can change over to any method of operation in less than a minute.

Baker claims three advantages for its 4-way carriage:

- *Lower initial cost.* One carriage rather than several different attachments does the job.
- *Faster operation.* No time is lost in substituting attachments to handle different jobs.
- *Full use of fork truck capacity.* The Baker unit is little heavier than a standard fork carriage. So the truck can carry rated payload.

The company expects the 4-way carriage to pay its way wherever one truck has to handle many different kinds of operations: Move drums, cartons,

AS A STANDARD FORK LIFT, carriage handles full capacity of truck it's mounted on. The load above doesn't look as if it's going to make it, so . . .

AS A SIDE-SHIFTER, carriage moves load to the right to fit into a tight spot. Side-shift is handy for stacking nesting skids and boxes, too.

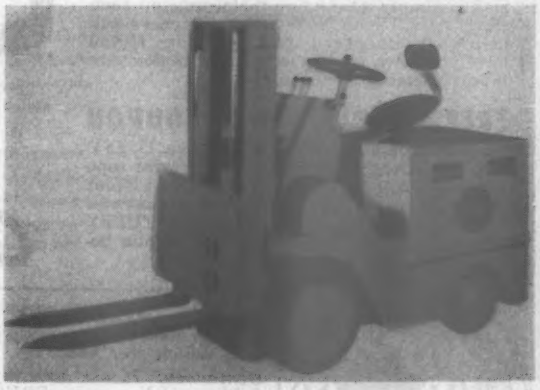
Works 4 Ways

and pallet loads. Handle skids and pallets of different sizes. And stack loads that could not be handled quickly without a side-shifter.

Conversion is quickly accomplished through a pin-and-block adjustment inside the fork carriage. With the pin and block in one position, the truck is a clamp or fork-spacer. With it in the other position, the truck becomes a side-shifter. The operator can quickly change the pin and block through two handholes on the face of the carriage. In either case—fork-spacer or side-shifter—the operator controls all lateral fork movement with one panel lever.

You can mount the 4-way carriage on Baker 2000-, 3000-, and 4000-lb. trucks now in use. Forks come with 36-, 42-, or 48-in. outside spread. You get 17 inches of fork-spacing action, 4½ inches of side-shifting either side of center.

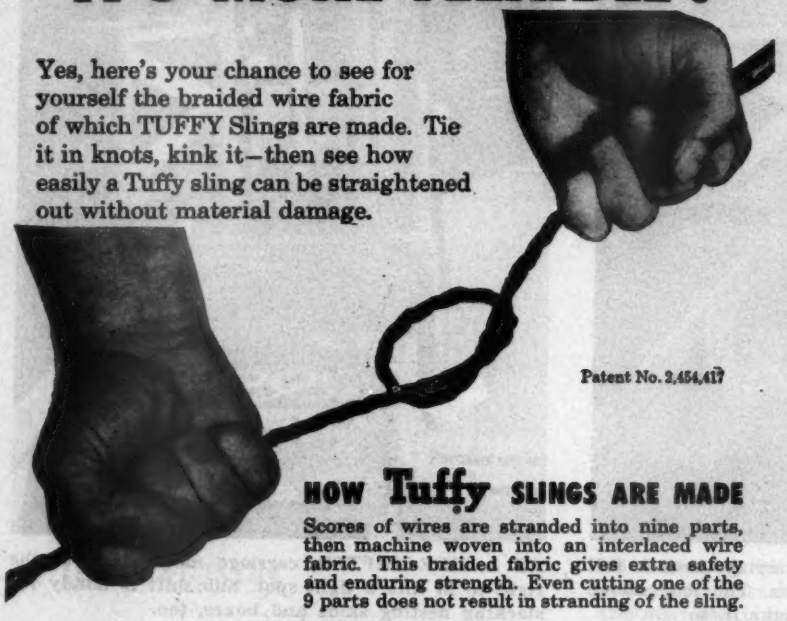
Baker Industrial Truck Div., The Baker Raulang Co., 1250 W. 80th St., Cleveland 2.



FOUR-WAY FORK CARRIAGE is simple and compact. Driver controls all lateral fork movement with one panel lever. There's just one adjustment—to change forks from fork-spacing to side-shifting operation. Driver quickly makes this change by hand through holes on the face of the carriage.

GET A FREE Tuffy® SLING AND PROVE TO YOURSELF IT'S MORE FLEXIBLE!

Yes, here's your chance to see for yourself the braided wire fabric of which TUFFY Slings are made. Tie it in knots, kink it—then see how easily a Tuffy sling can be straightened out without material damage.



Patent No. 2,454,417

HOW Tuffy SLINGS ARE MADE

Scores of wires are stranded into nine parts, then machine woven into an interlaced wire fabric. This braided fabric gives extra safety and enduring strength. Even cutting one of the 9 parts does not result in stranding of the sling.

11 TYPES—PROOF TESTED FOR SAFETY

There are 11 different types of Tuffy Slings, each one proof-tested to *twice* its safe working load. And the safe working load is plainly marked on metal tags on each sling. Also, Union Wire Rope engineers will help work out special sling problems. If you have your own rigging loft, Tuffy braided wire fabric is available by the reel.

FREE SAMPLE—MAIL COUPON

To show you the difference between TUFFY Braided Wire Slings and ordinary wire rope slings, we have made up a quantity of 3-foot slings. We want you to have one so that you can test it and prove to yourself that TUFFY Slings really are better. Mail the coupon below today for yours.

UNION WIRE ROPE CORPORATION
Specialists in Wire Rope, Braided Wire Fabric and High Carbon Wire
2234 Manchester Ave. Kansas City 3, Mo.

Gentlemen: Please have my Union Wire Rope fieldman deliver me a FREE Tuffy Sling.

Name_____

Address_____

City_____ Zone____ State_____

Firm Name_____

Begins on page 152

Handy Hydraulic Lift

This is Big Joe. He'll handle a load of 750 lb., lift it to a height of 52 inches. You can use it for stacking drums, handling dies or other heavy units, or for unloading from the tailgate of trucks.

Big Joe is hydraulically operated through a foot lever. It comes with safety brake, also extension plates for handling bulky loads. Price: $236.50.

Big Joe Mfg. Co., 184 N. Franklin St., Chicago 6.

Automatic Coupler for Truck Trains

A new automatic coupler speeds up towing of trucks and trailers. There are two parts to the coupler—a spring-loaded jaw and a counterbalanced bail. The two cast steel units couple automatically when backed into one another. There's a foot-operated latch on either side of the jaw for disengaging. Spring-loaded jaw will not disengage on ramps.

Colson Equipment & Supply Co., 1317 Willow St., Los Angeles.

Turn the page

YOU CAN ALWAYS trust R-C METERS

R-C Meter installation for large gas utility. New unit, in front, has capacity of 1,000,000 cfh. Two older meters, in background, have been in use for years.

If you're measuring gas for production processes, you can't take any chances on quantities. If you are buying or selling it, you need cash register accuracy. You want equal precision for departmental cost accounting.

The permanent accuracy of R-C Positive Displacement Meters has long been proved for all these purposes by manufacturers and utilities which buy, sell and use gas. Four important reasons account for this unvarying reliability:

1. Accuracy is not affected by variations in specific gravity, rate of flow, pulsation, moisture, impurities or uncontrollable factors.
2. Accuracy is not subject to adjustment of meter or recorder by operators or other persons.
3. Accuracy is not affected by reasonable overloads.
4. Accuracy is permanent because measuring chambers are surrounded by precision-machined, cast iron surfaces.

The 31 standard sizes of R-C Meters give capacities from 4,000 cfh to 1,000,000 cfh. They are extremely compact, permitting installation in cramped spaces. Indicating and recording instruments are available for all types. For whatever purposes you measure gas, you can permanently depend on R-C Meters. Ask for Bulletin 40-B-14 or write us your specific problem.

Part of an installation of nine R-C Meters in large processing plant, measuring acetylene gas sold to nearby manufacturers. They also use R-C Meters on receiving ends. Capacities range from 3,000 cfh to 130,000 cfh.

ROOTS-CONNERSVILLE BLOWER CORPORATION
510 Central Ave.,
Connersville, Indiana

ROOTS-CONNERSVILLE
BLOWER BUILDERS SINCE 1854
ONE OF THE DRESSER INDUSTRIES

Oil-Dri

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ABSORBENTS

Absorb all types of Oils, Greases and Fats plus Water Solutions from oil-covered floors.

EASY TO USE

Just spread it on grease spots

ECONOMICAL

Saves time, saves maintenance expense—can be used again and again

REDUCES INSURANCE PENALTIES

Recommended by insurance companies and safety organizations

Check these Advantages

1. Reduces slipping hazards
2. Reduces fire hazards
3. Improves floor conditions
4. Reduces maintenance labor costs
5. Reduces insurance penalties
6. Improves working conditions
7. Permits safer, easier, faster, walking on plant floors
8. Improves plant housekeeping

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520 N. MICHIGAN AVE. CHICAGO 11, ILLINOIS

MATERIALS HANDLING EQUIPMENT

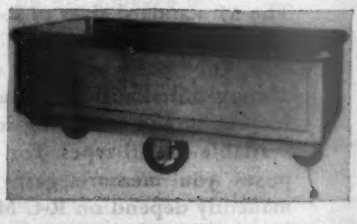
Begins on page 152

One-Man Truck Handles Heavy Drums

With this Handy Van one man can pick up and move heavy barrels and drums. Capacity is 1000 lb. It's constructed of ¼-in. angle iron, welded throughout. Handles (not visible in photo above) for manipulating the truck telescope into the frame when not in use.

You tilt the Handy Van on end to pick up a drum. Then roll both drum and rack back onto the truck wheels. In this position you can move the load on truck's rubber-tired or metal wheels.

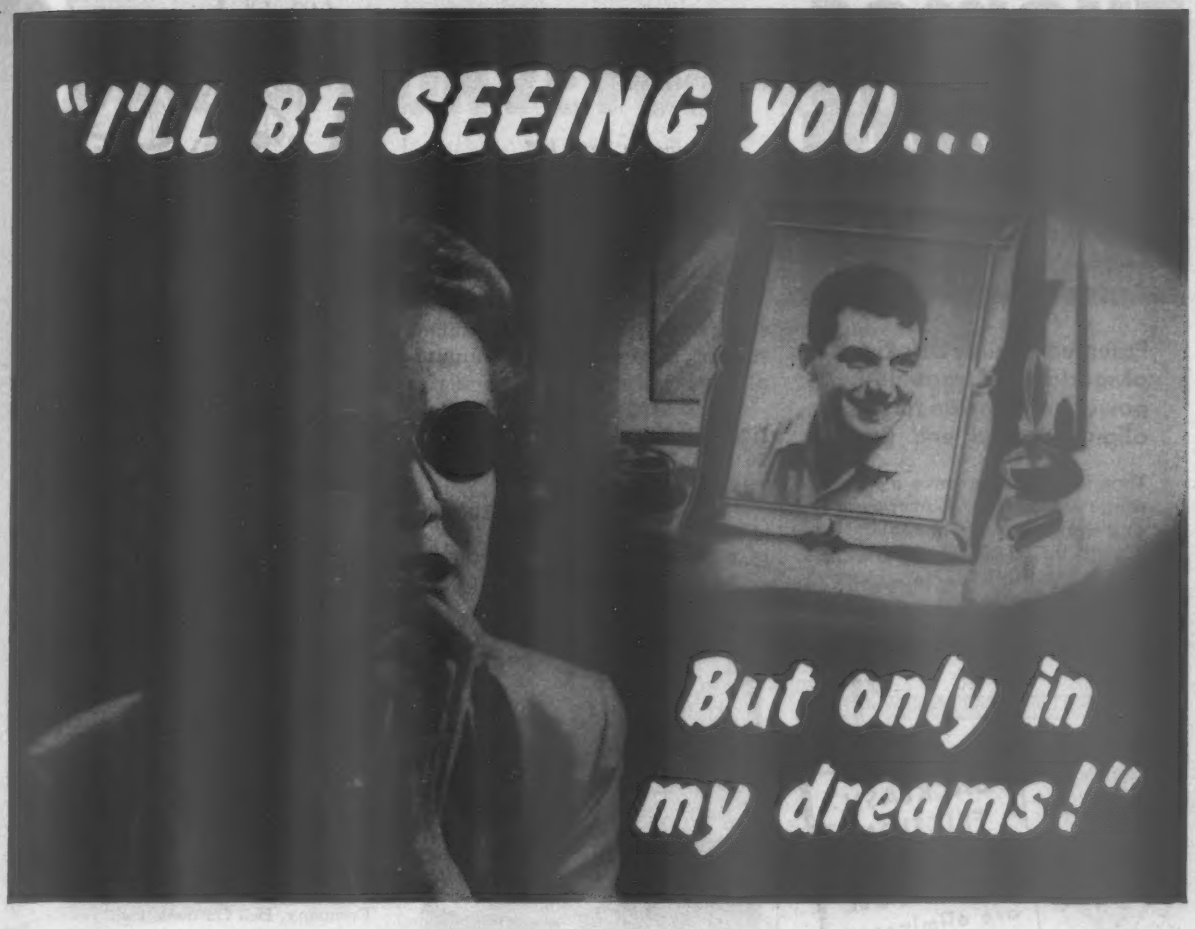
Allied Dealers Supply, Monterey Park, Calif.



Stainless Steel Tub-Type Truck

Stainless steel throughout, the inside of this truck is carefully finished and polished to resist corrosion. Corners are rounded for ease of cleaning. It's designed for sanitary use in food, chemical, and textile industries.

Top edges are reinforced to stiffen the side panels. Removable



1 SELL EYE SAFETY TO EMPLOYEES
Ask your distributor's representative to show you the kit of posters, pay envelope inserts, PA system scripts and other material that sells workers forcefully on *desire to use* proper safety eyewear.

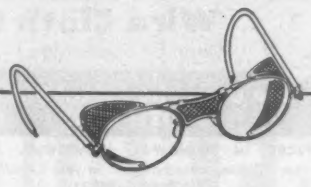
2 SAFETY GLASSES FOR EACH JOB
A complete range of Bausch & Lomb safety eyewear, engineered to meet the most rigid tests for each job classification in your plant.

3 PROTECTION *PLUS* CORRECTION
For at least 50% of your workers prescription lenses are necessary to working efficiency as well as to safety. Your B&L distributor offers prompt prescription service on all types of industrial eyewear.

THIS picture story is a bitter one in the eyes of the younger workers in your plant.

New employees, usually inexperienced, represent fertile ground for seeds of incaution. To help prevent a rise in eye accidents, Bausch & Lomb suggests extra educational effort in their direction.

If the picture above stirred a spark of interest in you, it will in many of your employees. See it in poster form along with other graphic educational material designed to help make workers *want* to conform with your safety regulations. It's part of the *total* eye safety service of this great pioneer in industrial eyewear. Bausch & Lomb Optical Company, 650-10 St. Paul St., Rochester 2, N. Y.



BAUSCH & LOMB *Safety Eyewear*

THOMAS Flexible ALL METAL COUPLINGS

FOR POWER TRANSMISSION REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:

½ to 40,000 HP
1 to 30,000 RPM

Specialists on Couplings for more than 30 years

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

NO MAINTENANCE PROBLEMS.

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

MATERIALS HANDLING EQUIPMENT

Begins on page 152

plug (optional) in one corner permits drainage of contents. Truck comes with any type and arrangement of swivel or rigid casters. Wheels can be cushion rubber, hard rubber, aluminum, plastic, or semi-steel.

Truck capacity is 1000 lb. Inside length is 60 inches; width, 26½ inches and depth, 16½ inches.

Market Forge Co., 25 Garvey St., Everett, Mass.

Telescoping Fork Truck With Low Mast

The Trucker series of fork lift trucks can get up high to stack loads in plant areas. But it can also get down low to fit into highway trucks and freight cars. The telescoping unit will tier to a height of 108 inches. But with collapsed lift it stands only 68 inches high.

Low weight and good maneuverability give the unit flexibility in operating inside vans and freight cars. The truck can elevate its forks 54 inches before secondary channels rise to increase over-all height. This permits two-high stacking inside truck bodies.

The gasoline-engine fork trucks come in capacities up to 2000 lb.

The Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15.

Turn the page

Imagine your dog's delight on seeing a solid column of biscuits 160' long and 42" wide! That's the carrying surface of this Cambridge Woven Wire Conveyor Belt in a recirculating oven at Kendall Foods Company, Bell Gardens, California.

Balanced Weave, specified for this installation, is low in cost, eliminates creeping of the belt on the drive pulley, and provides high tensile strength. Open mesh of the belt allows free circulation of heat within the oven . . . crumbs and broken bits of biscuit fall through the belt, cannot foul up automatic packaging equipment at the end of the oven.

Whether you're baking biscuits, processing meat or canning vegetables, there's a Cambridge Woven Wire Conveyor Belt to help mechanize your production. Stainless steel to meet sanitary codes is a standard material of construction for our food plant customers. Call in your Cambridge field engineer today, let him explain the superior construction features of . . .

Cambridge Woven Wire Conveyor Belts

WRITE FOR FREE MANUAL illustrating and describing conveyor belt installations for food, metal-working, chemical, ceramic and other processes.

The Cambridge Wire Cloth Co.
Dept. E • Cambridge 10, Md.

See us at the Metal Show BOOTH C-111

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See "Belting - Mechanical" in your Classified Telephone Directory.

ATLAS CONVEYOR SELECTS

QUAKER CONVEYOR BELTING

For Longer Service... Tougher Hauls

Border to border . . . coast to coast Atlas Conveyor Company, leading producer of stationary and portable conveyors, selects and recommends Quaker Conveyor Belting. Installed on all types of Atlas Conveyors Quaker belts prove their long-lasting "wearability."

Quaker Conveyor Belting is fabricated from prime selected duck with friction covers of scientifically compounded, long-lasting rubber. It is built to resist weather, shock, abrasion and flexing . . . is service-proved to give extra wear and top performance on the toughest jobs.

Whatever your needs for original equipment or replacement maintenance — transmission belting, hose or packings — there's a Quaker product that will provide long service and high production at low cost. For complete data on the Quaker line of Pre-tested Products write for the new General Catalog.

TO MAKE BELTS LAST LONGER . . . GET THIS C M P

Informative folders, booklets and charts available on how you can get more production out of industrial rubber products. No cost or obligation.

QUAKER RUBBER CORPORATION

DIVISION OF H. K. PORTER COMPANY, INC.

PHILADELPHIA 24, PENNA. BRANCHES IN PRINCIPAL CITIES

Quick construction plus lasting Quality . . . Quonsets meet the needs of industry!

The Brady Manufacturing Co., *Des Moines, Iowa, was in urgent need of additional manufacturing space. In just* one work week *from the time the foundation was ready, this 80 x 100-foot Quonset was in use by the company.*

Cornell-Dubilier Electric Corp., *South Plainfield, N. J., has been able to expand its activities speedily and economically with Quonset 40 buildings. This 40 x 200 Quonset took only* 19 days *to erect, including insulation, lining, and utility installation.*

TODAY'S industrial needs for additional space are *immediate* needs—for today's production is moving into high gear. Time spent in waiting for new construction is time lost from productive output.

That's why Quonsets are the ideal answer to the nation's need for fast expansion of warehouse and manufacturing facilities. They go up quickly—in *days* instead of *months*. Framed of N-A-X HIGH-TENSILE steel, Quonsets are *permanent*, durable, non-combustible buildings requiring little upkeep.

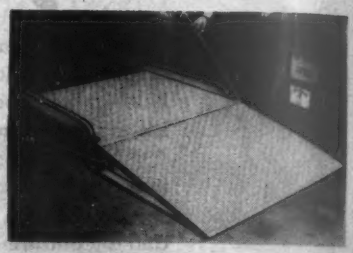
A Quonset building is usually completed and occupied in less time than it takes to do the preliminary work on ordinary structures. Let Quonsets save you time and money. Write us today.

GREAT LAKES STEEL CORPORATION

Stran-Steel Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

Begins on page 152



Drop Lock Prevents Dock Board Slippage

To keep its combination dock boards and ramp in place, Magline has added a simple locking device. Two locking bars are built into the ramp section of the unit. When the ramp is in position, these bars drop into place and hold the unit securely in place.

This magnesium dock board and ramp combination is designed to overcome extreme height differences between dock and car.

Magline, Inc., Pinconning, Mich.

Fork Stacker for Special Tote Bins

If you are using "Tote" bins, this is for you. The Jackstacker fork truck is designed to move these bins onto and from the production line. (For those who don't use them, "Tote" bins are tightly sealed containers for handling, shipping, and storing bulk materials.)

Photo above shows a Jack-

Turn to page 161

Avoid messy oil

Specify

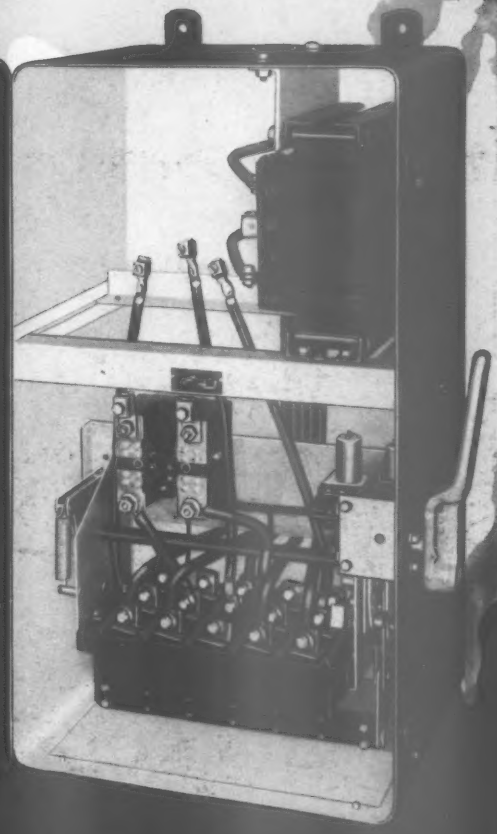
Bulletin 646

Manual Transformer Type

REDUCED VOLTAGE STARTERS

with

air break contacts



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ALLEN-BRADLEY

QUALITY

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Quality

most acclaimed manual starter on the market!

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

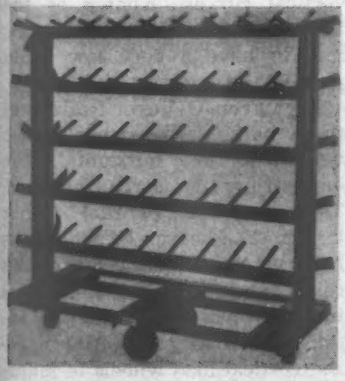
A-B
Quality

Begins on page 152

stacker about to lift one of the bins from its tilting rack. Lifting forks of the Jackstacker have an 11-in. spread to provide ample clearance on each side of the tilt rack. A special lifting arrangement enables the "Tote" bin to be tilted on its rack by the Jackstacker forks.

This 4000-lb. capacity truck comes in telescopic and non-telescopic models. High-tiering unit will double-deck the bins.

Lewis-Shepard Products, Inc., 194 Walnut St., Watertown 72, Mass.



Peg Rack Truck

Armatures, rotors, gears, similar parts can be moved safely and efficiently in production with one of these heavy-duty peg rack trucks.

The truck is made of heavy steel, all welded. It comes with either 5- or 6-in. roller-bearing rubber-tired casters. Parts are hung on cushioning racks inclined at a 15-deg. angle. Pegs are ⅜-in. square steel bars covered with oil-resisting fiber tubing. Leather belting at the base of the pegs provides cushioning. Each truck has 90 pegs. The pegs are 7 inches long.

Lloyd Engineering Co., 59 Stephen St., Belleville 9, N. J.

Turn the page

Low-Cost Heating

FOR NEW BUILDINGS OR PLANT EXPANSION

Type 150 Suspended Unit Heater — propeller fan type; 60,000 to 150,000 Btu capacities; shipped assembled and pre-wired. AGA and UL approved.

Mueller Climatrol

GAS-FIRED UNIT HEATERS

— save costs, save space

For a compact, efficient heating system where time and costs are vital factors — the Mueller Climatrol unit heater line supplies the perfect answer!

✓ *Installation Cost is Low* — shipped pre-wired, completely assembled . . . just hang, connect to gas and power lines, and vent. No special chimney needed.

✓ *Operating Cost is Low* — efficient horizontal design assures maximum heat extraction, minimum fuel costs.

✓ *Maintenance is Easy*—can be completely cleaned and serviced from below without lowering the unit.

When you think of space-heating think of Mueller Climatrol. Capacities to fit any requirement.

Capacities and Types for Every Job

Blower Type 151 — Four sizes: 60,000 to 150,000 Btu input; all welded, horizontal design; AGA and UL approved. Shipped assembled and pre-wired.

Floor Type UH — nine sizes: from 180,000 to 540,000 Btu input in 45,000 increments; AGA approved. Easy to assemble and install.

94th Anniversary

TEAR OUT THIS COUPON AND MAIL TODAY!

L. J. Mueller Furnace Co.
2042L W. Oklahoma Ave., Milwaukee 15, Wisconsin

Please rush me complete information on space-saving and cost-saving Mueller Climatrol unit heaters.

Name.....
Position.....
Company.....
Company Address.....
City.....(.....) State.....

S-54A

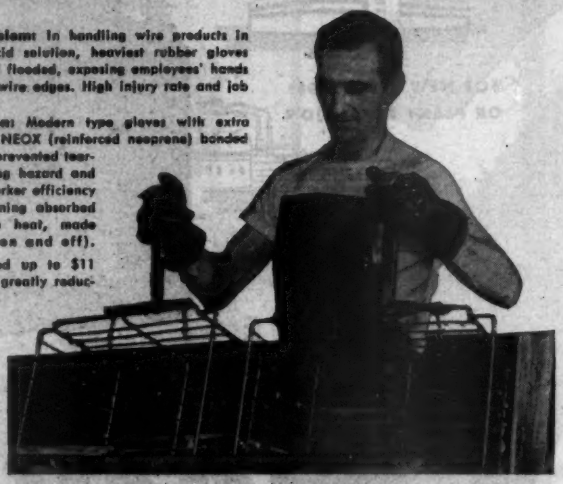
Mueller Climatrol

How good management solved lost-time problem

Case No. 217—Problem: In handling wire products in 120°-180° chromic acid solution, heaviest rubber gloves frequently snagged and flooded, exposing employees' hands to hot acid and sharp wire edges. High injury rate and job dissatisfaction.

Management Solution: Modern type gloves with extra heavy duty coating of NEOX (reinforced neoprene) bonded to strong fabric which prevented tearing. Eliminated flooding hazard and materially improved worker efficiency and comfort (fabric lining absorbed sweat, insulated from heat, made gloves easy to slip on and off).

Change-over also saved up to $11 per man per week by greatly reducing glove replacement.



Safe hands lose no production time

We have case records of hundreds of industrial operations, handling all types of sharp, abrasive and slippery materials with and without the presence of heat, oils, acids, caustics, solvents, degreasants, where the proper selection of work gloves (supplied or recommended by management) has resulted in:

• Fewer lost-time accidents • Faster, surer work handling • Less spoilage • Improved job attitude • And 40% to 70% savings in usual glove costs to companies or employees who provide their own.

There's a correct glove for every job
Good management makes it available

Maximum Protection with Comfort, Freedom and Firm Grip

Extra heavy NEOX coating (reinforced neoprene, extremely resistant to cutting, abrasion, chemicals). Fabric lining prevents snagging, absorbs sweat, insulates, makes glove easy to wear. Non-slip grip. Many styles.

Heavy Weight or Flexible to Suit Work

Various types with NEOX (reinforced neoprene) coatings, over-all or on palm and thumb only. Fabric linings.

Non-Slip Natural Rubber Coated

Sure grip, wet or dry. Resist cutting, abrasion. Comfortable as canvas gloves but safer and wear 5 to 10 times longer.

Vinyl Plastic Coated Work Gloves

Very resistant to abrasion, oils, many chemicals. Special plasticizers preserve their flexibility. In various styles.

We offer consulting service on specific problems or complete plant surveys: **(Used by DuPont, Cadillac, RCA, Pittsburgh Plate Glass, International Harvester and many others.)**

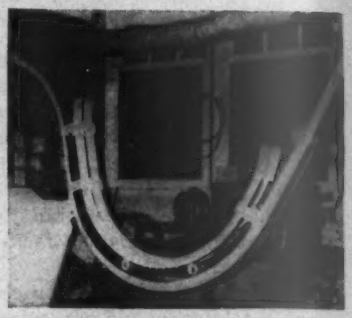
Without cost or obligation we will gladly study your hand-protection problems and practices, make recommendations and furnish the procedures and materials for complete on-the-job tests. For full information, write our Safety Engineering Service.

Edmont Edmont Manufacturing Company
1212 Walnut Street, Coshocton, Ohio

World's largest maker of coated industrial gloves

MATERIALS HANDLING EQUIPMENT

Begins on page 152



Overhead Chain Conveyor Takes Tight Turns

A new type of construction for overhead chain conveyors provides full rolling contact at all times—even on horizontal and vertical curves. Known as the Econ-O-Veyor, this system is said to have a very low chain pull for any given loading.

Each Econ-O-Veyor trolley has three ball bearing wheels—two vertical and one horizontal. The vertical wheels carry the load. They run on parallel T-bar tracks. The horizontal wheel sits between the T-bars and provides rolling contact on horizontal turns. On vertical turns, two additional T-bars are placed above the vertical load wheels to maintain rolling contact.

As a result the Econ-O-Veyor is said to have low power consumption for a conveyor of this type. Trolleys are mounted on 12-in. centers. You can get straight runs, vertical (up and down) and horizontal turns.

Shuler Conveyors, Inc., 43 Hutcheson Place, Lynbrook, N. Y.

Noiseless Vibrator

Latest Cleveland vibrator is seen but not heard. Vibration is created by a reciprocating piston. But the maker claims a pocket of air at each end of the vibrator cushions the piston stroke to prevent noise.

The vibrator is air powered.

Turn the page

Electrical capacity doubled without new transformers or wiring

Cleveland Trencher Company installs G-E capacitors to handle twice the load on its electric circuits—finds saving in power costs pays for installation in three years

Cleveland Trencher Company manufactures large trench excavating machinery, uses several welders as well as induction motors for machine-tool drives. Together, these were responsible for the low power factor.

Capacitors were installed in out-of-the-way locations, near motors and welders, and are disconnected from the line when machinery is shut down.

Early in 1948, the Cleveland Trencher Company planned to increase its manufacturing capacity—found itself facing possible electrical overloads. Since power factor was down, the company decided on G-E capacitors instead of new wiring and main transformers. Ninety kvar were installed that year.

TWO YEARS LATER, LOAD WAS INCREASED AGAIN. Again capacitors provided the electrical capacity—60 kvar this time. Altogether load amperes have been doubled since 1948—without new wiring or transformers. And because power factor has been raised from 48 to 98 per cent, the saving in the power bill has already paid for the installation.

CAPACITORS WILL RELIEVE WIRING AND TRANSFORMERS of overload, allow for expansion, and improve voltage conditions. Also, if there is a power-factor or demand clause in your power contract, they often make possible worthwhile dollar savings.

Read what capacitors have done for others. Write for a copy of GEA-5167, "A Way to Cut Power Cost." Address *General Electric Company, Schenectady 5, N. Y.*

This new book can help you

"Capacitors for Industry" is a new, complete book on the application of capacitors in industrial installations. Full of up-to-date information, it is the work of four General Electric application and design engineers. "Capacitors for Industry" is the newest member of the General Electric-Wiley book series. Copies may be purchased from John Wiley and Sons, Inc., 440 Fifth Avenue, New York.

GENERAL ELECTRIC

407-204

Topping them all!

52% OF ALL GAS-POWERED FORK TRUCKS

40% OF ALL ELECTRIC-POWERED FORK TRUCKS

ordered in the first 6 months of 1951 were CLARKS! In 1950 Clark sold—50% of all gas-powered fork trucks...26% of all electric-powered fork trucks...

This steadily-rising sales curve (or trend) clearly reflects consistently-lowered materials-handling costs effected by Clark machines. The fact that more and more Clark machines go into the hands of more and more satisfied customers every day is your positive assurance of Clark's superiority.

Find out how you, too, can save money and time by the use of Clark equipment. Fill out the coupon—mail it today!

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS

AND POWERED HAND TRUCKS · INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION · CLARK EQUIPMENT COMPANY · BATTLE CREEK 12, MICHIGAN

Please send the following: ☐ SAFETY SAVES ☐ BASIC FACTS ☐ CONDENSED CATALOG ☐ MOVIE DIGEST

Name_____

Firm Name_____

Street_____

City_____ Zone____ State_____

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

Begins on page 152

It weighs under 3 lb., measures 6½ inches long by 1½ wide. Vibrator has application in packaging of foodstuffs, chemicals, similar bulk materials. There's a special lug at one end for bolting directly to hopper or bin.

Cleveland Vibrator Co., 2732 Clinton Ave., Cleveland.

Divided Platform Truck for Wheeled Containers

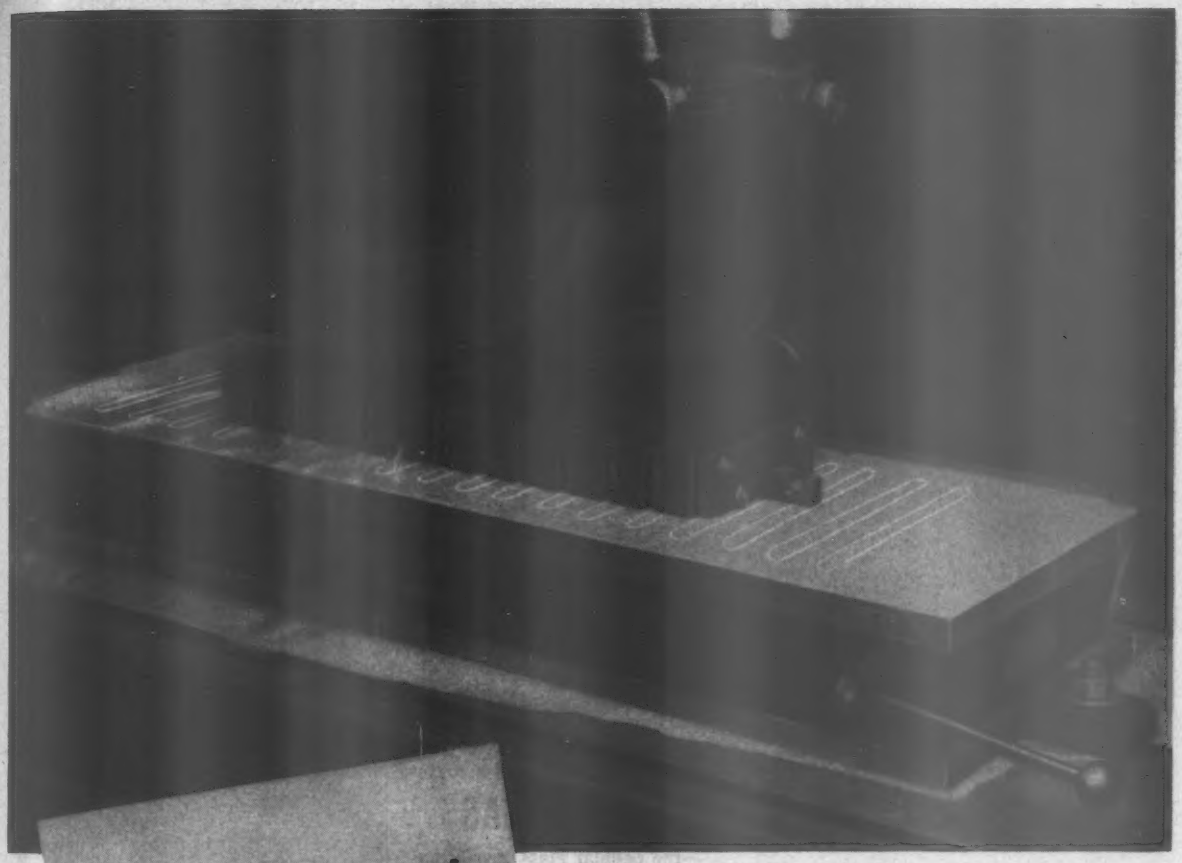
Though it may look more like a fork truck, this is actually a platform truck. But the platform has been built in two sections to accommodate carts and buggies that have a middle wheel. One common form of steel buggy has a pair of wheels mounted on an axle in the middle, and one cast at each end. That's the type of load this platform truck is designed to handle. The middle wheel of the buggy sets in the space between the platforms.

In meeting this special application, the truck nonetheless retains its versatility. You can still use it for standard skids and tote boxes.

You can get the trucks as all-electric or gas-electric units. They come in 2000-, 4000-, and 6000-lb. capacities. Platforms are 6¾ inches wide, 63 inches long, placed 14 inches apart. Lowered they are 10½ inches above the floor; raised, maximum height is 15 inches.

Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14.

Turn the page



Economical way to save machinists' time

PERMANENT MAGNET CHUCKS

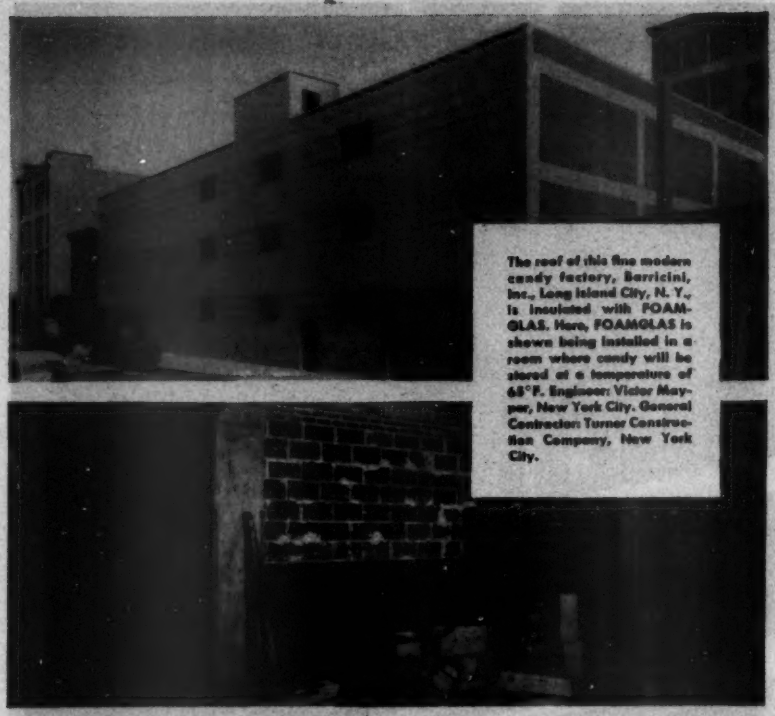
by Brown & Sharpe make the most of a skilled machinist's time — let him do, speedily, many tasks that require extra work by other means.

These economical time-savers are completely portable, have no wires to connect, cost nothing to operate, hold as long as desired without heating, last indefinitely. Permanent Magnet Chucks speed setting up . . . eliminate the need for clamps, vises, jigs or fixtures on many jobs. A quick shift of a lever engages or disengages magnetic holding power.

Complete line includes Rectangular Models for grinding, inspecting, light machining; and Rotary Models for light lathe work, cylindrical and face grinding. Rectangular Models available in 8 sizes from $2\frac{7}{16}$" x $5\frac{1}{4}$" to $12\frac{1}{8}$" x 36"; Rotary Models in 5", 7", and 9" diameters. For sale only in the United States and its territories. Write for catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

WE URGE BUYING THROUGH THE DISTRIBUTOR

Brown & Sharpe B·S



The roof of this fine modern candy factory, Barricini, Inc., Long Island City, N. Y., is insulated with FOAMGLAS. Here, FOAMGLAS is shown being installed in a room where candy will be stored at a temperature of 65°F. Engineer: Victor Mayper, New York City. General Contractor: Turner Construction Company, New York City.

Barricini Inc. keeps candy quality high . . . insulation costs low . . . with FOAMGLAS

—the cellular glass insulation

● Candy manufacturers know that exact control of storage room temperatures keeps their chocolates and bon bons looking and tasting their best. And they, like manufacturers of many other products, have found that FOAMGLAS is a great help in maintaining control of temperatures—and insulating costs.

This unique insulating material is an effective barrier to heat travel and cold transfer. When installed in walls and ceilings, on roofs and under floors of all sorts of structures, it helps reduce heating and air-conditioning costs. And, since it needs no maintenance or repairs, FOAMGLAS is the most economical insulating material you can use.

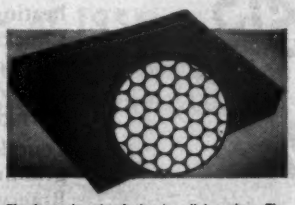
For more complete information, be sure to send for a sample of FOAMGLAS and a copy of our latest booklet.

PITTSBURGH CORNING CORPORATION
PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

FOAMGLAS®

the cellular glass insulation



The best glass insulation is cellular glass. The only cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, verminproof. It has unusually high resistance to moisture, chemicals and other elements that cause insulation to deteriorate.

Pittsburgh Corning Corporation
Dept. N-101, 307 Fourth Avenue, Pittsburgh 22, Pa.

Please send me without obligation a sample of FOAMGLAS and your FREE booklets on the use of FOAMGLAS for: Homes ☐, Normal Temperature Commercial, Industrial and Public Buildings ☐, Refrigerated Structures ☐.

Name.....

Address.....

City.....State.....

WHEN YOU INSULATE WITH FOAMGLAS . . . THE INSULATION LASTS!

Begins on page 152

AUXILIARY EQUIPMENT

Wet Blast Machine

This wet blaster is designed for finishing operations too delicate for dry blasting. For parts with thin edges and sharp corners, and for molds and dies requiring precision cleaning.

Among the special features is a vertical pump for slurry removal. This pump eliminates all suction piping and valves, as well as the labor usually needed to remove these fittings for inspection. There are no packing glands, so loss of slurry is eliminated.

The blaster has a low work ceiling. Yet the bottom of the machine is high enough off the floor for good housekeeping. Use of rubber hose wherever possible simplifies maintenance, eliminates noise from water hammer.

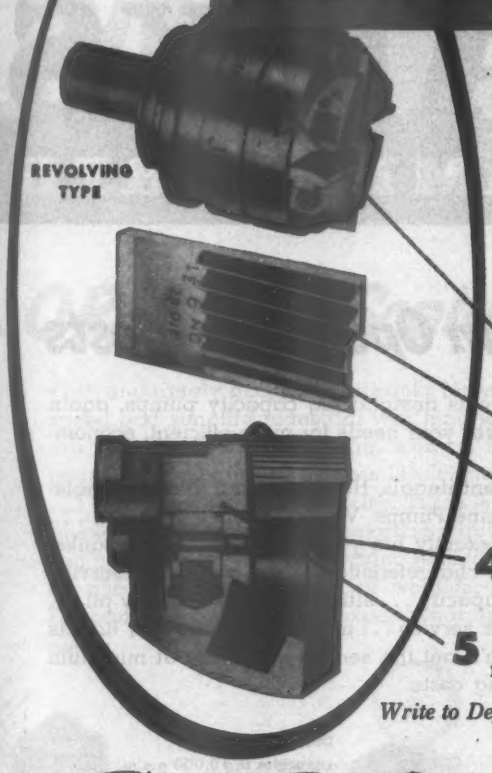
A reset timer tells at a glance the number of blasting hours the abrasive has been in the machine. An air ejector removes slurry from the machine when change in abrasive is necessary.

Cool fluorescent lights in blast chamber do not cause abrasive to bake on the glass.

American Wheelabrator & Equipment Corp., Mishawaka, Ind.

Turn to page 172

WITH GROUND THREAD TANGENT CHASERS



J&L Tangent Chaser Die Heads are rugged, dependable, time-tested tools. They are production engineered to produce better threads at speeds limited only by the material being threaded. Capacities are from #4 to 2".

There is a J&L Tangent Chaser Die Head engineered for your requirement. Stationary types are available for turret lathes or any machine where the tool does not turn. Revolving types are for automatic screw machines, drill presses, threading machines, or any machine where the tool is held in a live spindle.

Among the many features contributing to their ability to perform your threading job faster and better are these:

1. They are hardened and ground throughout. The chaser holding blocks are precision lapped for perfect fit into the dovetail slots in the body. Chaser cutting edges are held to a minimum distance from the die body.
2. Chasers are guaranteed to produce threads to Class #3 fit or better.
3. Exact helix angle is ground into the chasers after hardening. The result is a freer cutting tool—operating with a minimum of friction, heat and wear.
4. With a single set of chaser holders any standard thread within the rated capacity of the holders can be cut, regardless of helix angle. This eliminates the expense and trouble of constantly changing holders for different helix angles.
5. Chasers are changed and set quickly and easily, giving you more production hours each day.

Write to Dept. 710 for catalog.

Thread Tool Division

JONES & LAMSON

MACHINE COMPANY
Springfield, Vermont, U.S.A.

Machine Tool Craftsmen Since 1835

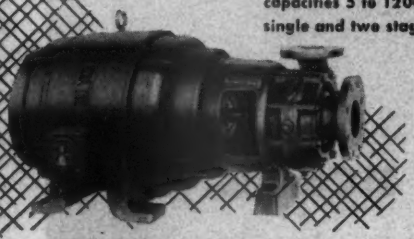
LITTLE...But Mighty Efficient

If your pump requirements call for a small to moderate size pump, you'll find the efficient, economical answer in the Fairbanks-Morse line.

Take Figure 5530 Side-Suction Centrifugal Pumps, for example. These compact, sturdy pumps are highly efficient, yet they're economical both in first and operating costs. Because Fairbanks-Morse is able to apply production line methods, with precision machining of all parts, you get the same high standards of material, workmanship and performance normally found only in highest quality split-case centrifugals.

Side-Suction Centrifugals . . . capacities 25 to 3000 g.p.m.

Builtogether Centrifugals . . . capacities 5 to 1200 g.p.m., single and two stage.



Or take Fairbanks-Morse Builtogether Centrifugals . . . the exceptionally compact units that combine motor and pump in one efficient unit. These space-savers can be installed in virtually any position.

Or take any of the small size Fairbanks-Morse pumps. Rotary, Westco Turbine Type, or small straight centrifugals. You get the same "big pump" quality and efficiency that pay off in more years of economical, efficient service.

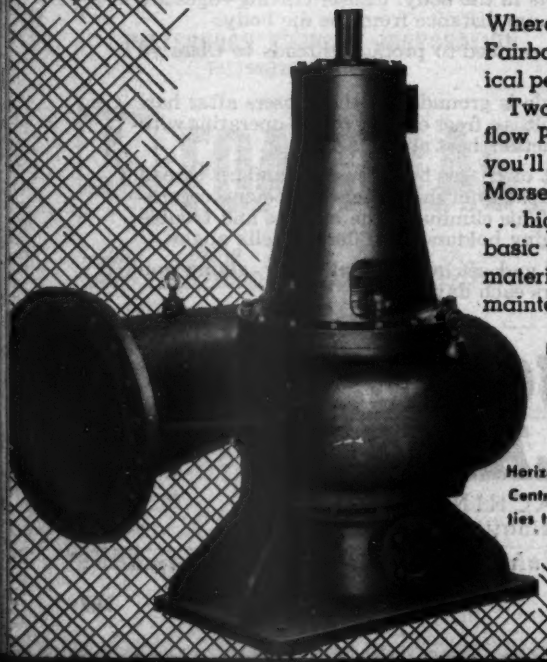
FAIRBANKS-

A NAME WORTH

BIG..But Low in Operating Costs

Where pumping requirements demand big capacity pumps, again Fairbanks-Morse can answer your needs for more efficient, economical performance.

Two-Stage, Split-Case Centrifugals, Horizontal and Vertical Angle-flow Pump, Deepwell Turbine Pumps, Vertical Propeller Pumps . . . you'll find the pump that exactly fits your needs in the Fairbanks-Morse line. Whatever the characteristics of the particular service . . . high or low head . . . capacity . . . efficiency . . . wet or dry pit . . . basic water supply, booster service . . . transfer service . . . or liquids material handling . . . you'll get the service you want at minimum maintenance and operating costs.

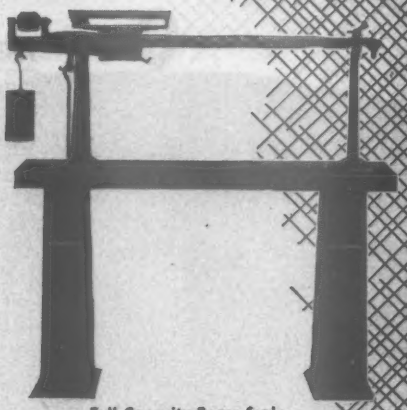


Horizontal and Vertical Angle-flow . . . capacities to 100,000 g.p.m.

Horizontally Split-Case Centrifugal . . . capacities to 50,000 g.p.m.

Deep Well Turbine . . . capacities to 10,000 g.p.m.

Take the WAIT Out of Weighing Whether It's a Beam Scale..



Full Capacity Beam Scale

You can weigh fast *and accurately* with a beam scale . . . if it's Fairbanks-Morse. These efficient weighing instruments were designed for easy-reading and accurate weighing.

All poises on Fairbanks-Morse Beam Scales are center indicating, full open face. Large, easily readable figures on face plates are set at a 45 degree angle to assure fast, easy reading . . . regardless of the height of the weigh-man! These Fairbanks-Morse advantages mean less chance for costly human errors . . . less "waiting on weights" . . . faster operation.

Fairbanks-Morse Beams can be furnished as standard, full capacity, or as Type-Registering with weights are printed on a card for accurate records. Beam counting scales are also available to count accurately *by weight*, small parts or pieces. Counting scales save time, money and are an essential aid in accurate inventory control.

Beam Counting Scale

Type Registering Beam Scale

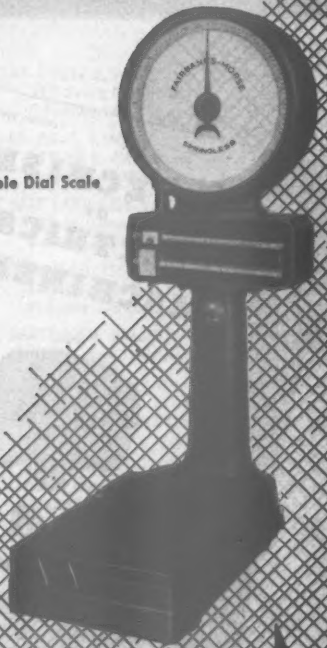
...MORSE

REMEMBERING

...OR A Dial Scale

Fast, enduringly accurate Fairbanks-Morse Dial Scales speed and simplify industrial weighing wherever they are used. Basic simple design, with an absolute minimum of moving parts, assures less chance for trouble . . . less chance for inaccuracies. There is a Fairbanks-Morse Dial Scale to fit any weighing requirement. They can be equipped with Printomatic Recorders to provide an accurate printed record of weights. Consult your Fairbanks-Morse weighing expert regarding your scale needs.

Portable Dial Scale



Platform Dial Scale

Bench Dial Scale

See next page for Fairbanks-Morse Sales Centers

FOR PROTECTION

AGAINST DUST, DIRT, ABRASIVES, STEAM, FUMES, ETC.

New Fairbanks-Morse Type QZE, Frame 284 Motor. Also available in smaller frame sizes.

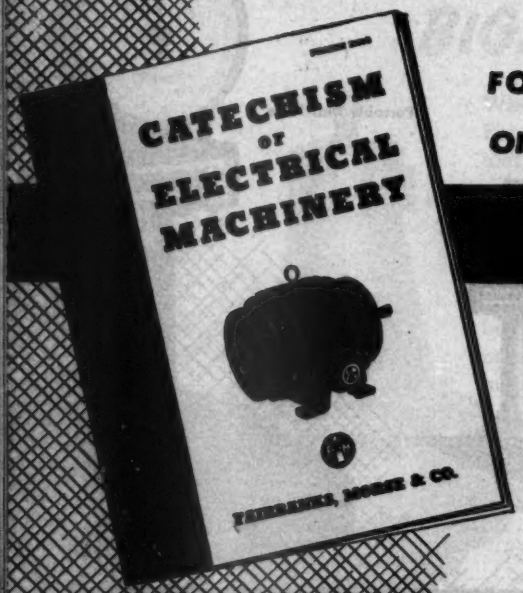
FAIRBANKS-MORSE

Totally Enclosed, Non-Ventilated Motors

For the toughest operating conditions, here is the newest development in totally enclosed, non-ventilated motors. Fairbanks-Morse Type QZE Motors are now available in Frame 284—delivering 7½ hp. at 1800 r.p.m., 5 hp. at 1200 r.p.m—filling a long-standing need for this type and size of motor. New features that assure cool, long-running service include a unique end-bell construction with cooling fins for efficient heat dissipation—and for safe, uniform, internal temperatures. For the full story on the new dependability this class of QZE Motors can bring to your most severe motor jobs, ask your Fairbanks-Morse motor representative or write Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois.

FAIRBANKS-

A NAME WORTH



FOR INFORMATION

ON DESIGN AND USE OF ELECTRIC MOTORS

Send for This Manual!

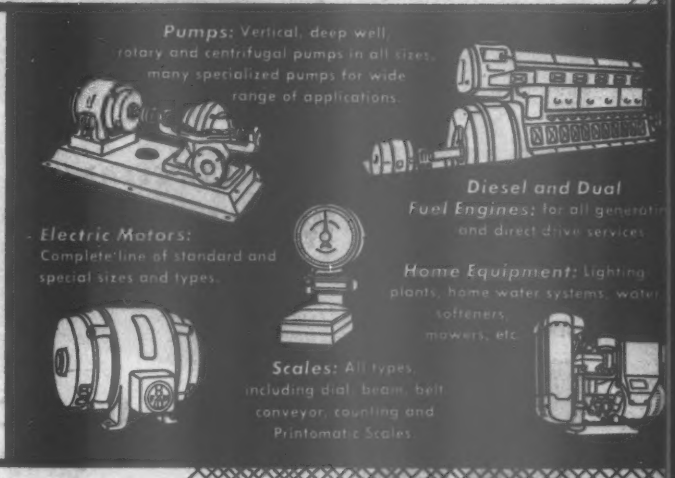
In this popular "Catechism of Electrical Machinery," you'll find an invaluable fund of basic information on the design, performance and proper use of the common types of alternating and direct current motors and generators. Primarily intended for training those who are not too familiar with electrical phenomena or terminology, it has been widely accepted by engineers, designers, and others as an aid in instruction of new men. It can be especially useful now, during this period of expanding and shifting employee rolls. Write your nearest Fairbanks-Morse Sales Center for your copy.

FOR ACTION

CALL YOUR FAIRBANKS-MORSE SALES CENTER

You can minimize procurement problems these days by depending upon your local Fairbanks-Morse Sales Center as a common source for the bulk of your requirements for electric motors, pumps, scales and diesel engines.

Fairbanks-Morse Sales Centers are staffed by factory-trained sales and service engineers who offer prompt and valuable application assistance for all Fairbanks-Morse products—as well as fast repair parts service to keep your old equipment going at top efficiency. For where to call—see the list below.


Pumps: Vertical, deep well, rotary and centrifugal pumps in all sizes; many specialized pumps for wide range of applications.
Diesel and Dual Fuel Engines: for all generating and direct drive services.
Electric Motors: Complete line of standard and special sizes and types.
Home Equipment: Lighting plants, home water systems, water softeners, mowers, etc.
Scales: All types including dial, beam, belt conveyor, counting and Printomatic Scales.

FAIRBANKS-MORSE

REMEMBERING

THESE ARE YOUR FAIRBANKS-MORSE SALES CENTERS

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AMhurst 7701

BALTIMORE 18, MD.
659 E. 25th St.
BEImont 5258

BIRMINGHAM 1, ALA.
626 N. Ninth St. Zone 4
3-6546

BOSTON 10, MASS.
178 Atlantic Avenue
LAfayette 3-3600

BUFFALO 3, N. Y.
33 Franklin St.
Lincoln 4210

CHARLOTTE 2, N. C.
Liberty Life Bldg.
Room 605
6-2893

CHICAGO 5, ILLINOIS
1550 S. State St.
HArrison 7-7100

CINCINNATI 2, OHIO
49 Central Avenue
MAin 3010

CLEVELAND 14, OHIO
3000 W. 117th St.
CLearwater 1-3300

COLUMBUS 8, OHIO
1034 Goodale Blvd.
WAlnut 8581

DALLAS 2, TEXAS
1713 N. Market Street
CEntral 4347

DENVER 2, COLO.
1500 17th Street
TAbor 6241

DES MOINES 17, IOWA
2017 Dean Avenue
6-1189

DETROIT 13, MICHIGAN
11110 East Warren Ave.
VAlley 1-7100

DULUTH 2, MINN.
Board of Trade Bldg.
2-7538

HOUSTON 13, TEXAS
5521 Navigation Blvd.
WAyside 2159—(LD 506)

INDIANAPOLIS 2, IND.
1499 N. Harding St.
FRanklin 3684
ATlantic 3092

JACKSONVILLE 6, FLA.
930 East Adams St.
5-6473

KANSAS CITY 7, MO.
1300 Liberty Street
Victor 6474

LOS ANGELES 11, CALIF.
4535 S. Soto Street
JEfferson 8151

LOUISVILLE 8, KY.
2008 So. Brook St.
CAlhoun 1469

MEMPHIS 7, TENN.
676 Jefferson Ave.
5-1614

MILWAUKEE 3, WIS.
404 N. Plankinton
DAly 8-0180

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MAin 4353

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EAst 0131

PROVIDENCE 3, R. I.
187 Pine Street
GAspee 1-1531

ST. LOUIS 2, MO.
217 South Eighth St.
CHestnut 7483

ST. PAUL 1, MINN.
220-26 E. Fifth Street
GArfield 4335

SALT LAKE CITY 1, UTAH
153 W. Second South St.
3-2108 & 3-5139

SAN FRANCISCO 7, CALIF.
630 Third Street
EXbrook 2-5855

SEATTLE 99, WASH.
Salmon Bay Terminal
ALden 6600

STUTTGART, ARK.
403 South Main St.
185

TULSA 3, OKLA.
1335 Hunt Bldg.
3-8231

WASHINGTON 5, D. C.
1000 Vermont Ave., N. W.
District 6694

FAIRBANKS-MORSE de MEXICO S. A.
Balderas 146, Mexico 1, D. F. Mexico
10 06 74 y 10 09 58

Export Division:
NEW YORK 4, N. Y.
80 Broad Street—HAnover 2-7470

B. H. Aircraft Co., Inc.
Farmingdale, N. Y.

SAVES 86% IN CLEANING TIME

Wheelabrator's fast thorough cleaning action scours metal surfaces brilliantly clean in but a few minutes — to save hours of cleaning time and cut costs to a minimum. That's the story at the B. H. Aircraft Company and everywhere else that Wheelabrator is used. Mr. Donald F. Baum, Vice-President, puts it this way:

"We are currently using the Wheelabrator for cleaning of all details prior to the spot welding and/or silver brazing of these details on our pipe assemblies. These details are made from .032 low carbon and .065 nickel-chrommoly steel and range up to 4" x 4" in size. The average time for cleaning is about 14% of the time for sand blasting. Sub assembly bodies are now Wheelabrated in 70% of the time formerly required."

See for yourself how this high speed blast cleaning can help you reduce your costs and improve the appearance of your products. Ask for a test demonstration without obligation. *Write today for details.*

Installation of the above Wheelabrator Tumblast saved 86% in cleaning time on pipe assemblies.

Wheelabrator
WHEELABRATOR & EQUIPMENT CORP.
474 S. Byrkit St., Mishawaka 13, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

NEW AUXILIARY EQUIPMENT

Begins on page 166

Portable Oil Purifier

The Hyflow reclaimer is a compact oil reconditioning unit on wheels. It's designed for periodic purification of hydraulic oils right on the job. The Hyflow removes suspended solids, oxidation products, and water from mineral or synthetic oils.

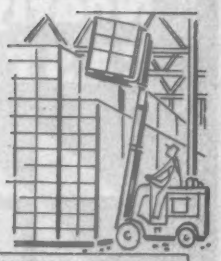
The unit withdraws oil from the machine-tool sump and pumps it through a filter for solids removal. A built-in vaporizer takes out any moisture. Both filter and vaporizer are equipped with thermostatically controlled electric heaters. A float control on the vaporizer prevents flooding.

A regenerative heat exchanger returns cool oil to the hydraulic system, minimizes power consumption. Crank-operated reels pay out oil hose and power cable. Suitable valves, gages, and sight glasses simplify units operation.

The Hilliard Corp., 152 W. 4th St., Elmira, N. Y.

General Purpose Centrifugal Pump

A new line of Economy centrifugal pumps ranges in capacity up to 100 gpm. at heads up to 120 feet. The units are of general duty type, adaptable to a variety of pumping applications. Maker recommends them for booster and process pumping, for hot water heating systems or



handling experts everywhere are talking about the NEW TOWMOTORS!

Model 480-P, one of five New Towmotors which include many new engineering features.

No wonder the new TOWMOTORS are such a sensation . . . just look at these features:

- Extra heavy duty frame
- Drop forge beam steering axle
- Functionally styled cowl
- Full vision instrument panel
- Precision controls in easy reach
- Super-strength forks
- Maximum free lift
- Engineered tire equipment
- Double universal joint
- Precision mast construction
- Maximum operating comfort
- Heavy duty hydraulic brakes
- One piece drive axle assembly
- Heavy, industrial-type engines

Get the facts—see the new Towmotor 15-minute film, "What Makes It Tick?"

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

TOWMOTOR CORPORATION, Div. 5
1226 E. 152nd St., Cleveland 10, Ohio

☐ Send me more information on the new Towmotor.
☐ I'd like to see the new film, "What Makes It Tick?"

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

HOW MANY PEOPLE HAVE YOU TALKED TO ABOUT AMERICANISM TODAY?

Nearly 4000 TYPES of CASTERS & WHEELS

Darnell CASTERS

If you want maximum floor protection, economy and efficiency Demand Darnell Dependability...Made to give an extra long life of satisfactory service . . . . .

DARNELL CORP. LTD. Long Beach 4, Calif.

60 Walker St., New York 13, N. Y.
36 N. Clinton, Chicago 6, Ill.

Begins on page 166

cooling towers. They're light in weight, easy to handle, install, and mount, says the manufacturer.

Standard pumps are bronze-fitted with casing and motor stand of close-grained cast iron. They're close coupled, and equipped with mechanical seals. Standard open-drip-type motors are used. Mounting is vertical. With addition of motor feet, pumps can be adapted to horizontal mounting.

By removing four readily accessible bolts, you can quickly dismantle the unit. Impellers, wearing rings, and mechanical seals are replaceable. The Type SCC pump comes in two sizes—2-in. suction and 1¼-in. discharge, or 1½-in. suction and ¾-in. discharge. More details in company catalog D851.

Economy Pumps, Inc., Divison of Hamilton-Thomas Corp., Hamilton, Ohio.

Compact Trap Cleans, Dries Compressed Air

Combining in one unit a dehydrant or a mechanical filter, and a self-purging trap, the Condensifilter will dry and clean compressed air for use in instruments and controls. A unit measuring 15 inches high by 9 inches in diameter will handle 30 cfm. at 100 psi. It screens water, oil, sludge, and other foreign materials from the air.

Total drop across the Condensifilter is less than 2 psi. at 100 psi. working pressure. Over 4 square feet of filtering surface to remove particles as small as one micron. Removal of one nut dismantles filter for cleaning and servicing. You clean the removable filter cartridge by dipping it in a suitable solvent.

Hankison Corp., 268 Renton Bldg., 1501 Beaver Ave., Pittsburgh 33.

Turn the page

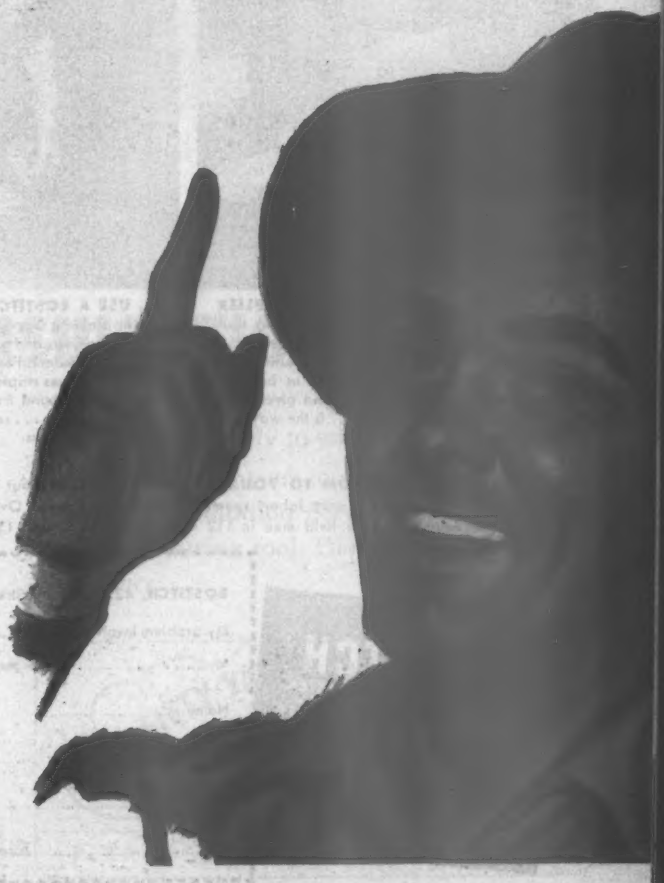
Cross-Bay Handling

COSTS LESS "Thru-the-Air"

WITH P&H OVERHEAD AND TRAV-LIFT CRANES

This idea may hold real advantages for you. At transfer points, loads can be moved at right angles with heavy duty and intermittent service cranes supplementing each other. It provides faster, more flexible movement of heavy loads "thru-the-air" to meet your production requirements. It helps keep manufacturing operations at top efficiency—prevents congestion and delays.

Let us show you how. As America's leading builder of overhead materials handling equipment, P&H puts a wealth of experience at your disposal. Our engineers can analyze your problems and recommend the best methods to coordinate your intra-plant handling service with "thru-the-air" speed and low costs.



P&H

OVERHEAD CRANES AND HOISTS

4525 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FAB HOMES

3 easy ways to cut your production costs

1. USE A BOSTITCH MOTOR-OPERATED STAPLING MACHINE — like this manufacturer of fishing tackle. He now assembles spools *four times faster* than when he relied on gluing. Both hands are free to handle the work. You, too, can cut your costs in fastening wood, light metal, paper, leather, rubber or plastics . . . in any combination.

2. USE A BOSTITCH P4 STAPLING PLIER — like this manufacturer who uses it to seal small cartons. Applies staples as far as 4¾" from edges. Its thin blade slides easily between folds. "Indispensable with us because it saves time, tape, rope . . . and gives us a more securely packed carton," is the way one enthusiastic user puts it.

3. USE A BOSTITCH T5 TACKER — here shown stapling backings to mirrors. "Twice as fast as hammer and tacks," report many users. And no wonder! Position it, squeeze it . . . that's all. Drives staples within 1/16" of inside corners. One hand free for holding work. No bruised fingers . . . no marred edges . . . no fumbling for tacks.

ATTACH THIS COUPON TO YOUR LETTERHEAD and find out how Bostitch stapling machines can help you save labor, speed production, cut costs. Over 800 models to fit your needs exactly. 300 field men in 112 cities in the U. S. and 11 cities in Canada to give you nearby service.

BOSTITCH
fastens it better AND FASTER with wire
ALL TYPES OF MACHINES FOR APPLYING STAPLES
ALL TYPES OF STAPLES APPLIED BY MACHINES

BOSTITCH, 422 Mechanic Street, Westerly, R.I.

My problem involves fastening.....

to..... I now use.....

Name..... Title.....

Firm .....

Street .....

City..... Zone..... State.....

Begins on page 152

ELECTRICAL EQUIPMENT

Moisture-Resistant Multi-Conductor Cable

Use of Fiberglas in its new control cable, say G-E engineers, has greatly improved resistance to crush, deformation, and moisture damage. The Fiberglas cloth is wrapped around each conductor to keep it in proper relative position under the outer jacket. During extrusion of the jacket, the rubber flows freely through the Fiberglas cloth to fill up the valleys between each conductor.

Fiberglas yarn reinforcement is also used in the cable's rubber center filler. Inorganic Fiberglas will not rot. There are no loose particles to foul conductors.

General Electric Co., Bridgeport, Conn.

•

SPLIT-PHASE MOTOR has high starting torque for use where high starting current is not objectionable. Fractional horsepower units have a service factor of 1.00. For the story on these Special Service units write for Bulletin 1-475pl to Century Electric Co., 1806 Pine St., St. Louis.

Turn the page

Bread or Business machines

Gulf Periodic Consultation Service helps reduce maintenance costs in the famous bakeries of Pepperidge Farm, Inc.

Gulf Periodic Consultation Service helps cut machining costs at International Business Machines Co., Endicott, New York.

. . . industry cuts costs through

GULF PERIODIC CONSULTATION SERVICE

This advanced cooperative plan contributes effective cost-cutting help to every industry that uses petroleum products.

Gulf Periodic Consultation Service makes available the services of trained sales engineers, backed up by technologists who are skilled in every phase of petroleum science, and who have had years of experience with practically every type of industrial process and equipment.

These specialists provide practical assistance on problems involving lubricants, fuels, rust preventives, cutting oils, solvents, waxes, and special process oils. Their knowledge and experience can be applied profitably to your plant or operation.

Write today for your copy of the booklet "Gulf Periodic Consultation Service" which explains this cost-reducing tool. Or contact your nearest Gulf office.

NEW!
READY-POWER
Diesel-electric units
FOR HEAVY-DUTY ELECTRIC INDUSTRIAL TRUCK OPERATION

• Featuring amazingly low-cost operation, long life and reduced maintenance.

• *Four sizes* to power electric industrial trucks of 6,000 lb. capacity and larger.

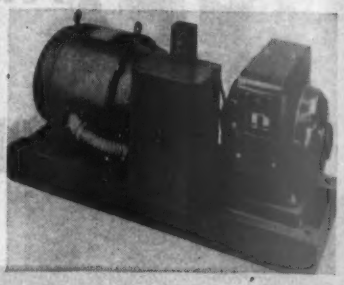
These new Diesel-Electric units are an outgrowth of Ready-Power's extensive background in the manufacture of gas-electric power units for industrial trucks and Diesel-engine-driven generators for industrial applications.

The READY-POWER Co.

3820 Grand River Ave., Detroit 8, Michigan

NEW ELECTRICAL EQUIPMENT

Begins on page 176



Frequency Converter for High-Cycle Hand Tools

Here's a packaged frequency converter for plants using high-cycle electric hand tools. This set converts 60-cycle power to 180 or 360 cycles for certain types of grinders, buffers, etc.

Units are self-exciting, have built-in voltage regulation which automatically compensates for fluctuations in load voltage. Unit shown is rated at 6 kw., 360 cycles, 3600 rpm. Other ratings and speeds available.

Electric Machinery Mfg. Co., 821 Second Ave., S. E., Minneapolis 14.

New Safety Switch Is A, C, and D Unit in One

Before simplifying its safety switch line, Bulldog, like other manufacturers, needed hundreds of different models to cover all Type A, C, and D applications. Now they can do the job with just 38 different Master Switches.

Bulldog has simplified the stocking of safety switches by eliminating C and D switches, and concentrating on the manufacture of a convertible Type A switch. The result is a simplified line of Class A switches that will handle almost any switching problem. And at Class C prices.

The new switch has a voidable interlock for converting to Type C operation.

Bulldog Electric Products Co., Box 177 Detroit 32.

Turn the page

GOULD

Plus-Performance Plan

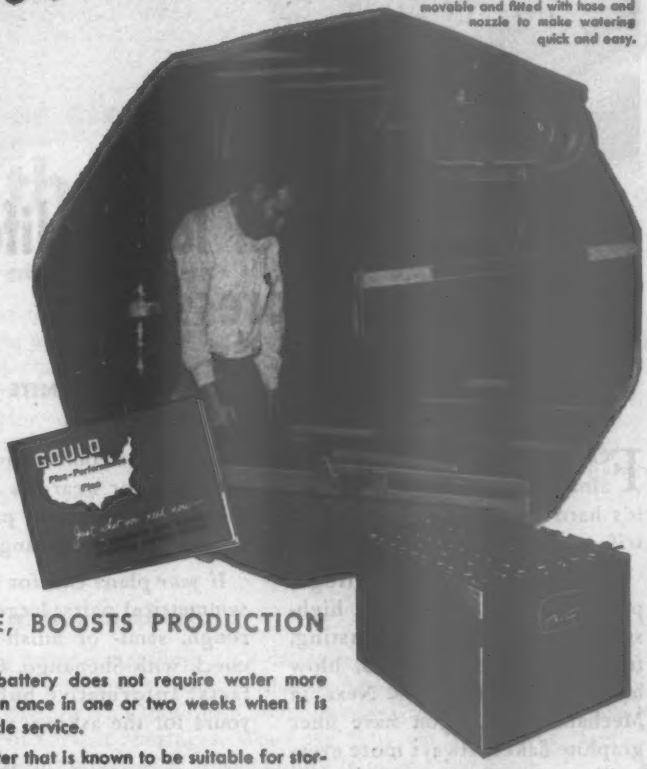
REGULAR WATER ADDITIONS

ADD MONTHS TO BATTERY SERVICE!

Distilled water containers should be movable and fitted with hose and nozzle to make watering quick and easy.

The amount of water used by a battery indicates its general condition. That's why regular, systematic watering is so important to maximum battery service. The GOULD PLUS-PERFORMANCE PLAN gives you complete technical information, not only on how to establish a regular watering routine, but on practically every problem connected with storage battery use.

Comprising manuals, articles, specifications, bulletins, charts, graphs and forms, the GOULD PLUS-PERFORMANCE PLAN tells you how to select, charge and handle, maintain and determine the condition of your batteries. Use it consistently and you can improve your battery performance as much as 50%! All material is free. A request will bring descriptive booklet by return mail.



The GOULD "Thirty" with "Z" Plates—America's Finest Industrial Truck Battery

WATERING ROUTINE CUTS DOWN-TIME, BOOSTS PRODUCTION

Level of electrolyte should be maintained between low and high level points. The minimum low level point should be above the splash cover. Maximum high level point is just under the bottom of the vent-well in the cover.

It is normal for electrolyte level to decrease very gradually with use. Rapidity of decrease will depend upon how much charge it receives over and above what it requires. Under normal conditions, a battery does not require water more often than once in one or two weeks when it is in full cycle service.

Only water that is known to be suitable for storage batteries should be used. It should be pure and free from any contamination. Distilled water is recommended. Water should be kept in clean containers of glass, plastic or porcelain with cork, glass or rubber stoppers.

GOULD STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

SHENANGO Centrifugal CASTINGS ... KEY TO SAVINGS

These ram pistons, centrifugally cast of Meehanite Metal for 300-ton hydraulic press, must withstand 4,000 p.s.i. Completely machined and assembled by Shenango.

Teamed up for longer life under pressure

SHENANGO CENTRIFUGAL CASTINGS OF MEEHANITE METAL

FOR pressure service . . . for almost *any* severe service . . . it's hard to match Shenango *centrifugally* cast Meehanite Metal.

First, Shenango's centrifugal process means a uniform, high-strength, pressure-dense casting, free from sand inclusions, blow holes and other defects. Next, in Meehanite Metal you have finer graphite flakes, always more evenly dispersed, thus avoiding stress concentrations and permitting a finer finish.

So here's a combination you just can't beat for wear-life . . . for resistance to abrasion, pressure or shock . . . for long-range *economy!*

If *your* plans call for essentially symmetrical parts, large or small, rough, semi- or finish-machined, check with Shenango. Get *all* the facts! Informative bulletins are yours for the asking.

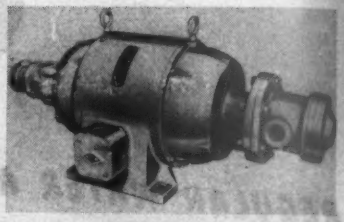
SHENANGO-PENN MOLD COMPANY
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL

NEW ELECTRICAL EQUIPMENT

Begins on page 176



Hydraulic Pump Motor With Universal Mounting

Here's a pump motor you can adapt to all makes of pumps. The endbell of this motor has a machined flange to which you directly mount the pump.

Reuland Electric claims its system of direct mounting provides:

- Precision alignment in every installation. The endbell flanges are pre-engineered to fit the registers on the pump mounting flange. Alignment problems are eliminated.
- Lower installation costs. You don't have to mount each unit separately and then align. You just bolt two flanges together.
- Shorter over-all dimensions. Direct mounting provides a compact package.

Pump flange mounts come on one or both endbells. You can get the motors in all standard ratings of horsepower and speed. Motors meet NEMA dimensions. Additional engineering data in folder No. HPM 102.

Reuland Electric Co., Alhambra, Calif.

•

A-C COMBINATION MAGNETIC STARTERS come with fused or unfused disconnect switch. Units made by Euclid Electric & Mfg. Co., Madison, Ohio, eliminate the wiring and mounting of separate disconnect switches and starters. For use with squirrel-cage motors for full-voltage, non-reversing starting, or with wound-rotor induction motors as primary switches.

Turn the page

Look at the men—Your local Graybar Representative *knows* electrical products . . . knows how they can best be used to meet your everyday requirements. You or your electrical contractor can also rely on him to provide accurate, up-to-date information on deliveries and availability of materials in your area.

Experienced Graybar Specialists in the major electrical fields are constantly available for consultation.

You'll find them well-qualified to give you advice on technical problems or help in the selection of alternates for materials in short supply.

For solutions to your electrical problems—

Look behind the Graybar tag

Look at the materials

Graybar distributes more than 100,000 different electrical items — products made by 200 of the nation's leading manufacturers. Quotation and information service covering items in both Graybar and supplier catalogs is readily available to help you or your electrical contractor compile job specifications and estimates.

Subject to defense priorities and regulations, Graybar can supply — on a single order — materials, equipment, and tools for wiring, lighting, ventilation, communication, or power.

Look at the methods

Modern inventory systems . . . a nation-wide network of warehouses backed by emergency stocks . . . day-by-day knowledge of the over-all supply picture — all these help your near-by Graybar office minimize the effects of current shortages. When you "buy via the Graybar tag", you take advantage of a proven ability to deliver the goods.

156—1110

GRAYBAR ELECTRIC COMPANY, INC.

Executive Offices:

Graybar Building, New York 17, N. Y.

Avoid electrical delays—plan ahead . . . via GraybaR

IN OVER 100 PRINCIPAL CITIES

don't slip up on Safety

USE FERA-MAT OR FERROX

Slips are costly . . . and far too frequent. In fact, they cause one in six of all disabling accidents. You don't have to put up with greasy, oily, hazardous floors. The cure is simple . . . and economical. For safety underfoot, use easy-to-apply Fera-Mat or Ferrox floor coverings.

FERA-MAT facts

- Peel it...roll it...and walk on it in safety.
- Comes in 6" x 24" cleats that are ideal for stairs.
- Covers large floor areas quickly... cuts costs.
- Goes down on any clean surface... and stays there.
- Diamond-hard surface, yet easy to clean.

FERROX facts

- Open the can...trowel it on... ...say so-long to slips.
- Perfectly suited for machine areas and uneven surfaces.
- Gives excellent coverage...40 square feet to gallon.
- Really sticks...resists oil, chemicals and weather conditions.
- Costs ⅓ as much as fabric-backed floor coverings.

AB-100

Take your choice of either FERA-MAT or FERROX, depending on your plant conditions. Look into American Abrasive's line of non-slip treads, plates and gratings. *Fact Folder on Safety Floorings contains data on Fera-Mat, Ferrox, Fera-Flow, Feralun, Bronzalun, Alumalun. Send for your copy.*

AMERICAN ABRASIVE Safety Floorings

AMERICAN ABRASIVE METALS CO. • IRVINGTON 11, N. J.

NEW ELECTRICAL EQUIPMENT

Begins on page 176

Remote Speed Control for Variable Transmission

Photo above shows the new Graham electrical speed control installed on one of its variable speed transmissions. The unit is designed for control and indication of machine speed at a remote location. Units are available for company transmissions ranging from 1/12 to 5 hp.

The control is said to give hairline accuracy of speed setting from zero to maximum speed. Speed changes can be made with the transmission running or stationary. Remote indicator can be calibrated to read any desired function of speed.

Graham Transmissions Inc., 3754 N. Holton St., Milwaukee 12.

400-Cycle Timing Motor

The Haydon Manufacturing Company claims it is filling a gap in available 400-cycle equipment with its new 400-cycle timing motor. It's designed for use as a time standard in applications involving relatively light loads. The hysteresis-type synchronous timing motor is available either as a separate component or in a variety of standard timers. Equipped with standard gear trains, units are interchangeable with company's 60-cycle and d-c motors.

Haydon Mfg. Co., Inc., Elm St., Torrington, Conn.

Turn the page

No Transmission Belt Job Too Tough ...For Thermoid

Have you some really tough transmission jobs—regular belt killers? They won't be too tough for a Thermoid Transmission Belt. Let your Thermoid Distributor prove that by furnishing exactly the right belt for your job.

For general service he will offer "400", the all-purpose belt that will satisfactorily service all normal operating requirements.

For severe service, or for high speeds with small pulleys, he will recommend Thermoid High Speed "R", made with extra strong, hard 35-oz. duck and top grade rubber. Where there are oil or fumes injurious to rubber, he will recommend Thermoid High Speed "N", with Neoprene friction and skim. Each type is practically custom-built for the service for which it is recommended.

Here's The Book That Will Answer Many of Your Questions

Ask for your free copy of Technical Bulletin No. 3678. It contains practical information, charts, tables and diagrams which will help you select the right transmission belt for your requirements.

Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

Now! **KEX PUTS SAFETY MESSAGES RIGHT INTO YOUR EMPLOYEES' HANDS**

HERE'S AN ADDITIONAL KEX SERVICE that ties in with your *Safety Program*—flashes its messages to the employee right at a place *where accidents happen.* And builds better employee relations.

Now a percentage of KEX* towels have printed on them safety slogans such as—Work Safely—Apply More Caution; Alert Today—Alive Tomorrow; Always Alert—Nobody Hurt; to mention a few.

In these days when skilled hands are so important, KEX puts into them not only a wiping tool that does a faster, more efficient job, but which also helps protect them.

INVESTIGATE KEX NATIONAL SERVICE—the smooth-flowing service that means regular delivery of industrial wiping towels, in any desired quantity, that are hygienically clean, uniform in size, weight and quality, are highly absorbent, and simplify plant housekeeping.

No investment. Nothing to buy. Only a low rental charge per towel. *And your source of supply of KEX safety towels is automatically assured!* Look for your local KEX distributor in your classified phone book. Or write—

"KEX" NATIONAL SERVICE

*REG. U.S. PAT. OFF.

295 Fifth Ave., New York 16, N. Y.

LIGHTING

Mercury-Vapor Lamp With Whiter Light

Westinghouse has used a little red to get white in its new 400-watt mercury-vapor lamp. A coat of red phosphor inside this fluorescent tube balances the lamp spectrum to provide a whiter light than previous mercury-vapor tubes.

Specially shaped lamp operates with even temperature over the entire wall. You can burn the lamp in any position—in existing fixtures for 400-watt mercury lamps.

The lower brightness of these J-H1 lamps widens the field of use for mercury vapor lamps. You can operate a J-H1 at mounting heights lower than previously practical. Average rated life—4000 hours. Rated initial lumens—18,000.

Westinghouse Electric Corp., Lamp Div., Bloomfield, N. J.

•

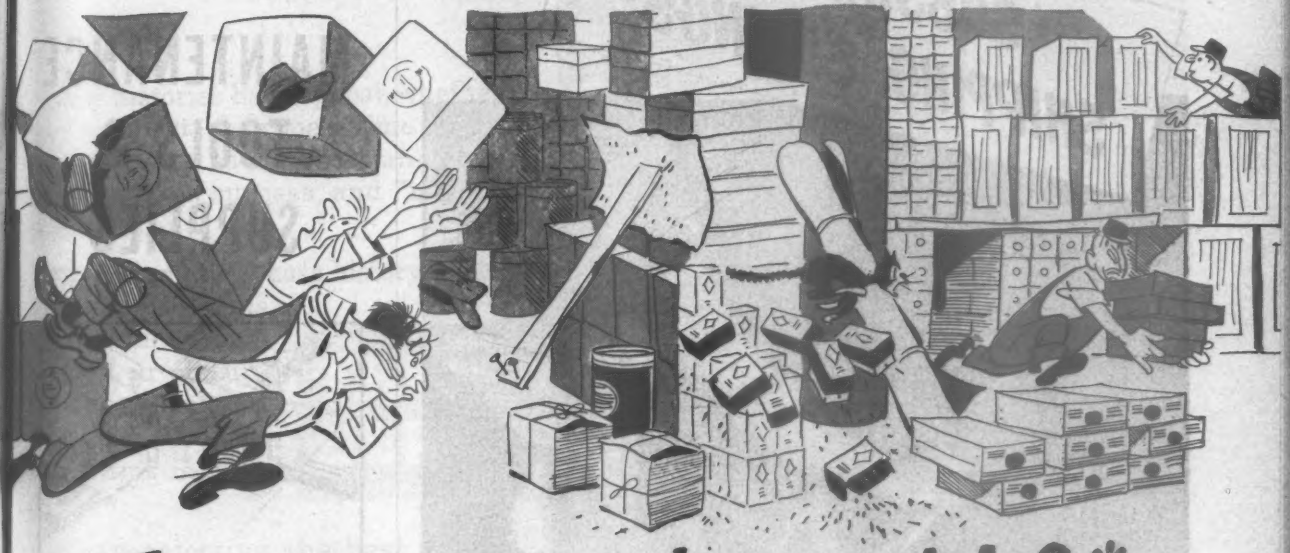
FLUORESCENT LUMINAIRES for production illumination are all white, inside and outside. The white avoids strong lighting contrasts, takes the gloom off the ceiling. Available in conventional 40-watt light units for 4- and 8-ft. Slimline lamps. Edwin F. Guth Co., 2615 Washington Ave., St. Louis 3.

DOLLAR-SAVING LIGHT BULB, says Westinghouse Electric Corp., Lamp Division, Bloomfield, N. J., will last 50% longer than a standard lamp. This 800-watt incandescent lamp resembles the picture tube of a small TV set. It has a built-in silvery reflector, a standard screw base. The bulb is designed for high-bay use.

Turn the page

loor Space was a problem in this B.C.* plant

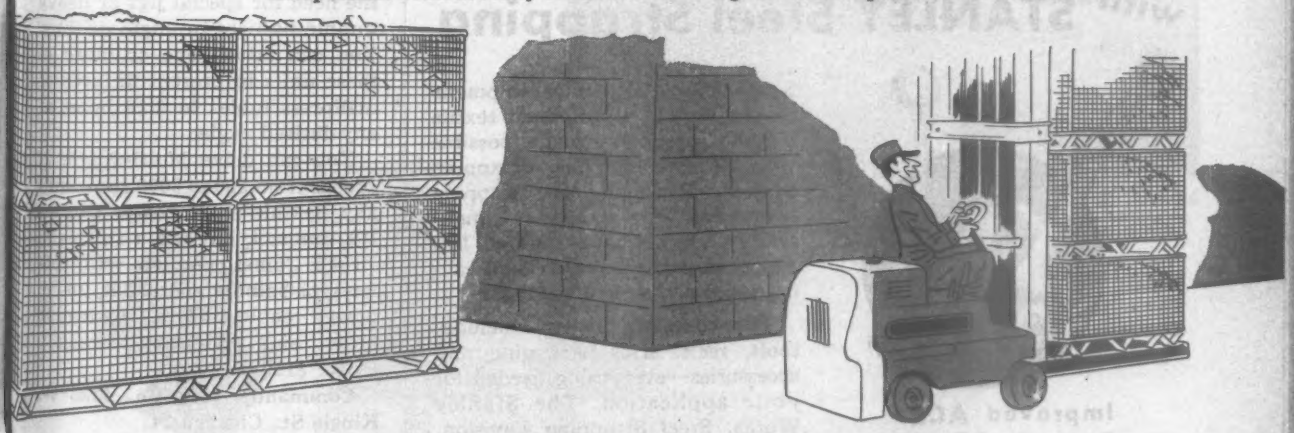
BC* (Before Cargotainers) inventory, parts and subassemblies were piled in every available nook and cranny in a chaotic wasteful and sometimes dangerous manner in this unfortunate plant. Costs went up and man-hours were lost until somebody finally saw the light. The terrible place looked something like this:



Then it went modern and A.C.*

When this plant joined the AC* (After Cargotainers) trend it started a new era of efficiency and profit. Smooth, safe, easy vertical storage took floor space off the critical list and actually made expansion possible without costly construction.

Everything became highly visible for quick inventory check—parts and assemblies remained right in their rugged collapsible Cargotainers as they moved to assembly line and shipment. This enlightened AC* plant now looks like this:



If by some chance, you are still BC why not let a Pittsburgh Materials-Handling Engineer show you how other plants have saved man-hours and storage space and increased efficiency by joining the AC trend. Write today to Dept. FM, Pittsburgh Steel Products Company, Grant Building, Pittsburgh 30, Pa.

The Steel Industry Needs Scrap—*Keep it Moving*

CARGOTAINERS

by Pittsburgh Steel Products Company

A Subsidiary of Pittsburgh Steel Company

Leading Manufacturer Reports...

SUBSTANTIAL SHIPPING SAVINGS—

with STANLEY Steel Strapping

Improved ACE Strapping Tool

Fast, rugged and easy to operate. Positive spring feed magazine holds 100 seals. Operates in any position. Three sizes—for ⅜", ½" and ⅝" strapping.

Safe—quick—economical shipment of products of a prominent textile manufacturer was made possible with the Stanley Steel Strapping System. Packaging and shipping operations were speeded . man-hours cut to the bone. Lighter, less expensive containers were used, saving space and weight in transit.

The complete System includes tools, reels, seals, strapping and accessories—everything needed for *your* application. The Stanley Works, Steel Strapping Division, 201 Lake Street, New Britain, Conn. Offices in principal cities.

STEEL STRAPPING AND CAR BANDING SYSTEMS

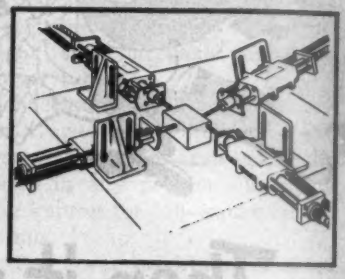
STANLEY

Reg. U.S. Pat. Off.

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

Begins on page 152

MAINTENANCE TOOLS & SUPPLIES



Portable Units Drill Holes at Any Angle

A versatile drilling head, called Multi-Angle, gives you unlimited freedom of set-up to handle any drilling problem. Maker says that his Multi-Angle drill eliminates the need for special jigs or heavy tumble fixtures in angle drilling. You can attach one or more of these units to present fixtures or drillpress tables to drill holes at any desired angle.

You can drive Multi-Angle at speeds from 500 to 3000 rpm. with any flexible-shaft power source. It's compact, but has a full 4-in. stroke. Comes complete with collet-type spindle and collet, 36-in. power cable, 36-in. hydraulic hose, and mounting bracket. Price: $125.

Commander Mfg. Co., 4225 W. Kinzie St., Chicago 24.

Transformer Welder

The Airco Model MCM 200-ampere welder is designed for general maintenance or production operation. It has a full 200 ampere, 50% duty cycle, NEMA rating. You can get 220 or 220/440/550 volt models—each

Case histories have appeal, whether they're about someone's time being bettered at a lathe or at an altar. Success likes success, and "misery likes company."

An "automatic's" case history is just an *end* of a *means* of machining facility. If you procure the right facilities, good case histories will result in *your* plant.

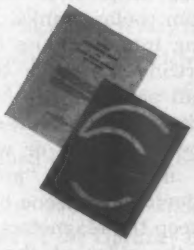
When selecting the best multi-spindle automatic facility for *your* needs, you will want to compare *all brands*. But you should have *full* information for a thorough comparison. You can have it on CONOMATICS.

Front Side of Tooling Area 1-5/8-SIX

THE FACILITY BEHIND THE NEWS

Rear Side of Tooling Area 1-5/8-SIX

Cross drilling, cross milling, end broaching, end milling, and sawing operations are commonly performed by stopping the work spindles – often a costly procedure. For certain requirements, such as for the broached hole in the piece shown, CONOMATICS have performed all of the operations mentioned without stopping the work spindles.



A Comparison of ALL Automatics is in favor of Cone

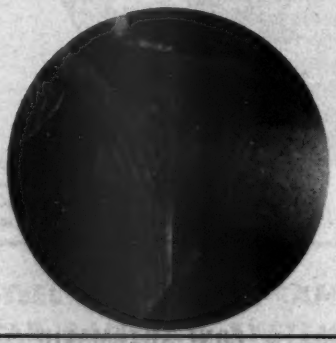
Conomatic } CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

This "2 strips — not 6" idea is saving important sealing labor in shipping rooms from coast to coast.

Because Snake Tape is reinforced, two strips alone give strap-like strength to cartons. Users report: "Damage claims due to tape failure are unknown."

Isn't it time to try Snake Tape on your cartons? We will gladly mail more facts and a 20-yard test sample at our expense. Send your request now to Angier Corporation, Framingham 1, Mass.

Sturdy cords are imbedded in waterproofing material between two layers of selected kraft. Best animal glue assures a perfect seal. 6 *WIDTHS* in 100-yd. rolls. Easily dispensed by almost any "cut-off" type machine.



(*Left*) SNAKE TAPE also gives unexcelled protection to products that "get it in the end." (Photo, courtesy Sloane-Blabon Corp., maker of quality linoleum products.)

Angier

Industrial Protective Papers Since 1895
Distributors in Principal Cities

LET SNAKE TAPE BE YOUR ANSWER TO NPA ORDER M-59
This order, effective May 1, 1951, limits the use of steel strapping. We suggest that you carefully review this order and investigate the merits of Snake Tape as the answer to new closure problems.

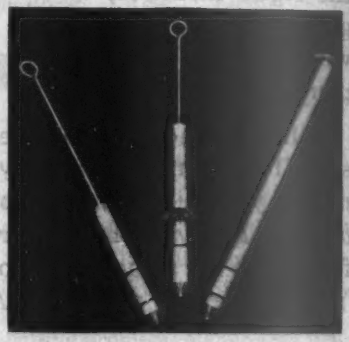
NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 186

with or without power factor correction.

Two open-circuit voltages are provided—80 volts on the low range, 55 volts on the high range. This combines easy arc starting with a lower kva. demand load and primary ampere current.

Air Reduction, 60 E. 42nd St., New York 17.



Magnetic Tools for Removing Boring Chips

With one of these magnetic probes you can locate and remove steel chips and metal parts from hard-to-get-at spots. Suggested uses include:

- Removing steel boring chips from holes drilled in castings.
- Fishing chips and metallic sludge from coolant tanks.
- Boring into tumbling media or carburizing materials to remove small parts.

Magnetools come with either hand wipe-off release or with a patented mechanical "pull-to-release" device. Neoprene bumper rings keep the Magnetool from grabbing the sides of the hole.

Magnetools use permanent magnets, are resistant to oil, water, and gasoline. Five models range in diameter from 1/16 to 2⅝ inches.

Multifinish Mfg Co., Dept 366, 2114 Monroe Ave., Detroit 7.

Turn the page

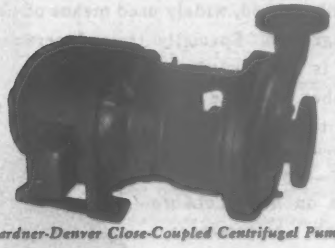
It's easy to get the right pump!

Gardner-Denver Side-Suction Centrifugal Pump

Call your Gardner-Denver field engineer. He'll gladly work with you in planning the most economical and efficient pumping layout. And he's an expert at specifying the *correct* pump for every installation.

He may recommend the compact Gardner-Denver Close-Coupled Centrifugal, which may be installed in many positions—or the easy-to-hook-up Gardner-Denver Side-Suction Centrifugal—or the heavy-duty Gardner-Denver Double-Suction Centrifugal. All Gardner-Denver pumps are built in a wide range of capacities—can be furnished in corrosion or abrasion resisting materials when required.

Write us today for complete information. Ask for the name and address of the Gardner-Denver pumping engineer nearest your plant.



Gardner-Denver Close-Coupled Centrifugal Pump

Gardner-Denver Double-Suction Centrifugal Pump

SINCE 1859

GARDNER-DENVER

THE QUALITY LEADER IN PUMPS, COMPRESSORS AND ROCK DRILLS

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd., Toronto, Ontario

"Up" Your Plant Capacity With TelAutograph Telescribers

Plant capacity at peak? Too frequently quick answers to upping capacity are: "More Help" and "More Space." In most instances, *improved operating technique is the real answer* . . . and the economical one.

Improved Materials Handling, Quality Control and Production Control through better operating techniques save time, reduce expense and increase output. This *is* increasing plant capacity.

Workable intra-plant communication is basic in bringing about these savings.

TelAutograph Telescriber Systems have provided factories with handwritten communication control for decades. Simplicity, accuracy and dependability of telescriber communication make it a highly valued, widely used means of plant integration. Specially trained personnel is not needed to operate a telescriber. Anyone who can write—can telescribe a message.

For specific information on how TelAutograph telescribers can be of value to your operation write to Dept. B-10.

TelAutograph CORPORATION

16 West 61st Street, New York 23, N. Y.

Telescriber TelAutograph Service

Handwritten Messages Deliver Themselves While You Write

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 186

Portable Spray With Built-In Compressor

This Spray-Pak is truly a portable spray gun. Everything, including a built-in compressor, is contained in one compact 17-lb. unit. There's no need for a compressed air line—just an electrical connection.

Spray-Pak has a dual-piston type compressor, a self-lubricating 10,000-rpm. motor, and precision-built mixing head and gun. Maker says it will handle any liquid that's sprayable. It's rated at 1 quart in 4 minutes at 50 psi. air pressure.

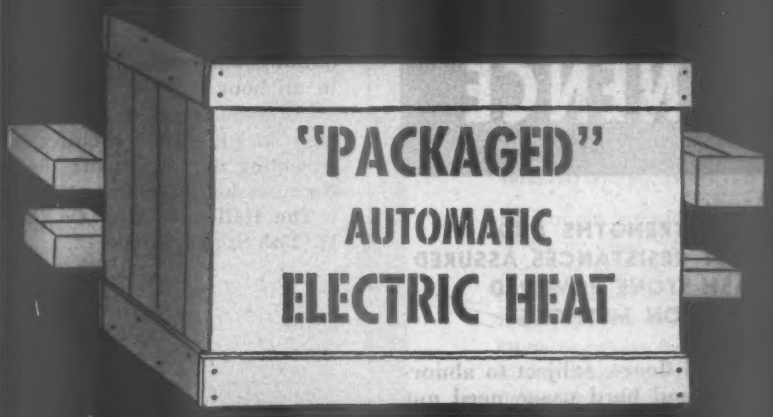
Kit includes carrying case, interchangeable nozzles, strainers, respirator, gaskets, etc.

Kapner Hardware, Inc., 2248 Second Ave., New York 29.

Quick-Setting Compound for Concrete Floor Repairs

Permanent repairs to chuck holes or breaks in concrete floors can be made speedily during working hours with Por-Rok Cement.

Maker says application of Por-Rok is fast and simple. First you clean out the hole or break. Then mix Por-Rok with water, and pour into the opening. The patch is ready for light loads in 15 minutes, normal trucking in 30



combining Heater and Thermostat in one unit

ready to go on your Jobs!

CHROMALOX 'Packaged' Electric Heaters are ideal as permanent or portable heat sources in tanks, drums, process kettles and other containers. With CHROMALOX Heaters you can heat accurately and maintain the temperature of degreasing, cleaning, pickling and plating baths. You can melt greases, asphalt and similar viscous fluids. CHROMALOX Units may be had in the types, sizes and wattages required to efficiently do your heating jobs. They are available with sheaths of copper, stainless steel, alloy and lead for resisting the corrosive actions of the solutions you are using.

Nation-wide engineering service for on-the-job assistance and recommendations. Write, wire or phone for the name of the Chromalox Engineering Representative serving you.

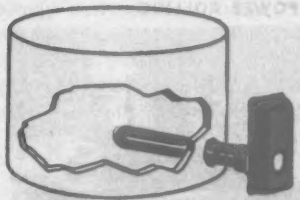
CHROMALOX

Electric Heat for Modern Industry

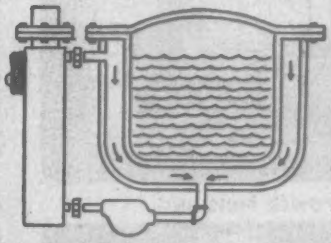
Variety and Versatility

to fit your Needs Exactly

Chromalox Immersion Heaters with built-in thermostats for portable or permanent use. Drawing illustrates Immersion Units, equipped with sludge-legs, installed over the side of the tank for direct heating. Available in various metal sheaths to resist the corrosive action of the liquid compounds.



Compact, thermostatically controlled, screw-in type Chromalox Immersion Unit is easily installed in smaller tanks and other containers. Thermostat range is 100° to 180° F.



Chromalox Circulation Heaters give accurate, controlled heat up to 750° F. for heating Dowtherm, Aroclor or heat transfer oils. Other uses include water heating applications such as steam boilers and accumulators, kettles, tanks and processing equipment, preheating fuel oils, heating air, nitrogen and other gases; drying steam, plastic powders, etc.

Clip Coupon

For complete details showing how to use Chromalox Heaters in your applications.

Industrial Division IC-96
EDWIN L. WIEGAND COMPANY
7518 Thomas Boulevard, Pittsburgh 8, Pa.
Please send "100 Ways to Apply Electric Heat" booklet.

Name_____

Address_____

City_____ Zone____

State_____

HEAVY-DUTY INDUSTRIAL FLOORS

POWER-INSTALLED FOR PERMANENCE

POWER RODDING

POWER ROLLING

POWER FLOATING

POWER FINISHING

HIGHEST STRENGTHS AND GREATEST RESISTANCES ASSURED BY FLASH-STONE POWERED INSTALLATION METHODS

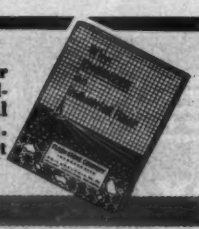
Industrial floors, subject to abnormal abuse and hard usage need not require continual maintenances or repair.

Our long experience and constant research over many years has proved the materials that stand up under conditions of heavy loads, chemical corrosion, abrasion, shock, cutting edges, oil alkali and other aggressive agents. But correct materials selection alone is not sufficient. The power-installation procedure is fully as important for long, trouble-free life; hand methods cannot adequately work the low-water materials.

The most advanced power-driven equipment is necessary to bring out maximum material performance. It also speeds the job, reduces downtime, results in worthwhile savings.

Let us show you the results that come from *engineering* industrial floors.

Write today for new, factual analysis of industrial floor economies. Sent without obligation.



FLASH-STONE COMPANY

INCORPORATED

Industrial Floor Engineers, Manufacturers, Contractors

34 E. RITTENHOUSE STREET, PHILADELPHIA 44, PENNA.

CHICAGO • CINCINNATI • PITTSBURGH

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 186

minutes, and heaviest loads within an hour.

Por-Rok is self-bonding, will not shrink, and requires no troweling for a smooth finish. Compression strength is 4500 psi.

The Hallemite Mfg. Co., 2446 W. 25th St., Cleveland 13.

Portable Pulling Press

You can take pulling tools to the job instead of vice versa with this portable Hydra-Tote. The unit turns an Owatonna hydraulic hand puller into a 17½-ton hydraulic press. It's ideal for maintenance work, since you can move and spot it around the plant. Hangers and trays provide space for additional accessories.

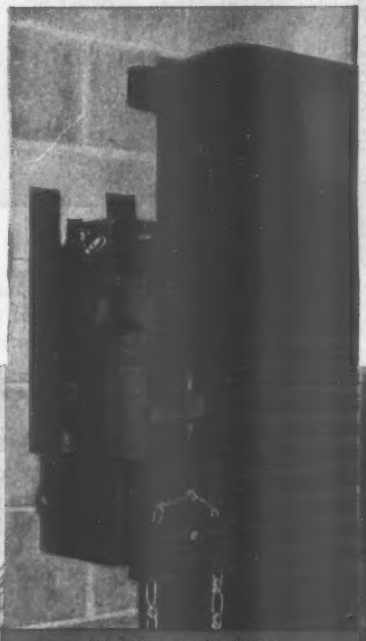
You have 10½-inches clearance between press uprights, 11 inches clearance from the ram to the top of the press plate, and 34 inches from the press plate to the floor. Maker says you have almost unlimited vertical adjustment.

Owatonna Tool Co., 388 Cedar St., Owatonna, Minn.

Turn the page

Rolling Steel DOORS

Manually, Mechanically, or Power Operated



MAHON STANDARD
POWER OPERATOR 920-P

Here again, in the illustration below, you see Rolling Steel Doors employed where no other type of door would serve the purpose . . . in six truck openings and one railroad opening in a combination inside rail and truck shipping platform arrangement in a new, modern foundry building. Rolling Steel Doors were selected because they occupy no usable space inside or outside the opening—and, because their quick-opening, quick-closing operation, by means of reliable power operators, offers many time-saving advantages. When you select a Rolling Steel Door, it will pay you to check the specifications carefully against the price tags . . . the Mahon curtain slat material is chemically cleaned, acid etched, and chromated to provide paint bond, and the protective coating of oven-baked enamel is applied prior to roll-forming. These are some of the extra value features of Mahon Rolling Steel Doors—you will find others. See Sweet's Files for complete information, or write for Catalog No. G-52.

THE R. C. MAHON COMPANY

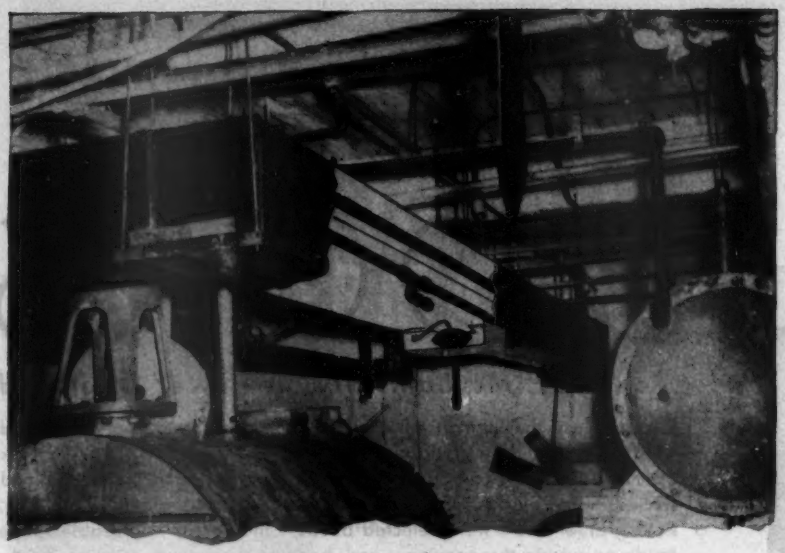
Detroit 34, Michigan • Chicago 4, Illinois • Representatives in all Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Doors and Fire Shutters; Insulated Metal Walls; Steel Deck for Roofs, Partitions, Acoustical Ceilings, and Permanent Concrete Floor Forms.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Six Mahon Power Operated Rolling Steel Doors 18' 7" x 14' installed in a new building designed and built by The Austin Company for the Albion Malleable Iron Works. Another Mahon Power Operated Door 17' x 22' was installed in a railroad opening in the same building.

MAHON



FOR CHEMICAL PROCESSING OPERATIONS...

"Automatic" FIRE-FOG PROTECTION BEFORE

IT BLANKETS IT ISOLATES IT QUENCHES

The use of certain chemicals in the manufacture of synthetics creates extremely dangerous fire hazard problems. Recognizing the need for maximum fire safety at the chemical processing operations shown, a new type of "Automatic" FIRE-FOG system was designed and installed. The system will detect a rupture in the process piping, immediately apply a water cooling spray of protection and will flush the flammable material to a safe location before the possibility of fire or explosion can occur. System operation is automatic and standard rate-of-temperature-rise heat detectors are employed. Vapor detectors are also used in conjunction with this type of system.

This typifies the design advantages of fire protection by "Automatic" Sprinkler. In many instances, actual hazardous conditions are simulated at our Testing Grounds. "Mock-ups" of the equipment to be protected are built and fire tests run, using the actual flammable materials involved.

It is this basic engineering, plus test and field experience that has earned for "Automatic" Sprinkler the reputation—leaders in the science of fire protection.

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

"Automatic" Sprinkler
FIRST IN FIRE PROTECTION
DEVELOPMENT • ENGINEERING • MANUFACTURE • INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 186

Light-weight Pneumatic Hammer

This Model G-200 air hammer weighs only slightly more than 2 pounds. But it will perform medium-heavy-duty work in general shop and maintenance operations.

The unit operates on 120 psi. line pressure, strikes up to 6000 blows a minute. You can adjust both striking force and speed through a simple finger trigger.

Sixty-six different tools adapt the G-200 hammer to a variety of jobs. Blanks are available for making individual tools for specialized tasks.

New safety feature is a 3-point ball bearing chuck that locks tools in working position and eliminates hazard of tool ejection. Driving piston of the G-200 is the only moving part.

Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1.

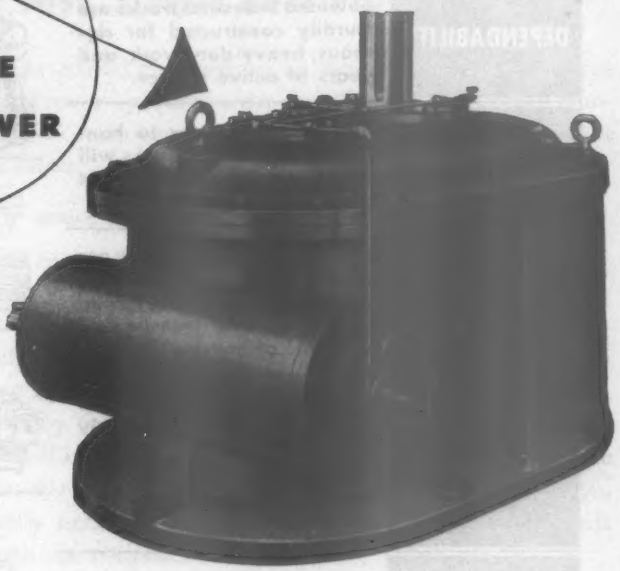
Metal-Spraying Gun

A new metal-spraying gun is designed specially for coating shafts, rolls, or machine parts on a lathe. Maker claims his Mogulectric gun greatly increases speed, and is virtually foolproof in operation. In addition to rebuilding worn parts, you can use the unit for spraying corrosion-resistant metal coatings, and for reclaiming mis-machined castings and parts.

The Mogulectric weighs 20 lb., so it's primarily for stationary operation. Metal spray is developed by atomizing wire stock at

have you a drive problem?

A FOOTE BROS.
WORM-HELICAL DRIVE
MAY PROVIDE THE ANSWER



● Rugged strength, the ability to stand up under punishing loads, the highest possible efficiency — these are characteristics of Foote Bros. Worm-Helical Drives.

Input shafts are horizontal, output shafts vertical, up or down — making these units ideal for use in chemical plants, pulp mills or wherever materials must be agitated or mixed.

Foote Bros. Worm-Helical Drives are available in ratios from approximately 25 up to 285 to 1—capacities up to 128 h.p. See your Foote Bros. representative or mail the coupon for information.

FOOTE BROS. GEAR AND MACHINE CORPORATION
4545 S. Western Boulevard • Chicago 9, Illinois

Whatever your requirements in power transmission, you will find exactly the drive best suited to your needs in the complete Foote Bros. line of enclosed gear drives and gear-motors. Check the coupon indicating the drive in which you are interested.

FOOTE BROS.
Better Power Transmission Through Better Gears

Foote Bros. Gear and Machine Corporation
Dept. I, 4545 S. Western Boulevard, Chicago 9, Illinois
Please send bulletins on drives checked below.

- ☐ WORM-HELICAL DRIVES
- ☐ LINE-O-POWER STRAIGHT LINE DRIVES
- ☐ MAXIPOWER HELICAL GEAR DRIVES
- ☐ HYGRADE WORM GEAR DRIVES
- ☐ FOOTE BROS.-LOUIS ALLIS GEARMOTORS

Name.....
Company.....*Position*.....
Address.....
City.....*Zone*.....*State*.....

HELP Yourself NOW..

to lower material-handling costs
... lower production costs
with ...

POWERED INDUSTRIAL TRUCKS

These are days of high operating costs, limited manpower, material-handling headaches, and stepped-up production demands . . . days that test your ability and know-how.

One way to overcome seemingly "hopeless" production tasks is to overhaul your plant's material-handling system NOW.

Powered industrial trucks can do wonders for your production schedules, make best use of your available manpower, and help you cut costs at the same time.

CHECK THESE TIME AND COST SAVERS:

DEPENDABILITY	powered industrial trucks are sturdily constructed for rigorous, heavy-duty work, and years of active service.
SPEED	quick-starting, easy to handle, maneuverable trucks will speed the flow of materials anywhere in your plant.
ADAPTABILITY	powered industrial trucks are designed for use in every industry . . . for stacking, lifting, unloading and transporting all types of goods.
ECONOMY	trucks handle materials in a fraction of the time formerly required, saving valuable man hours; men replaced can move into essential production.
SAFETY	industrial trucks make work easier for employees . . . eliminate many injury hazards . . . cut down product damage.

Powered industrial trucks can help bring new economy and efficiency of operation to your business NOW. Ask your industrial truck sales engineer to show you cost figures and case histories for *your* industry.

THE INDUSTRIAL TRUCK ASSOCIATION
3701 NORTH BROAD STREET · PHILADELPHIA 40, PA.

NEW MAINTENANCE TOOLS & SUPPLIES

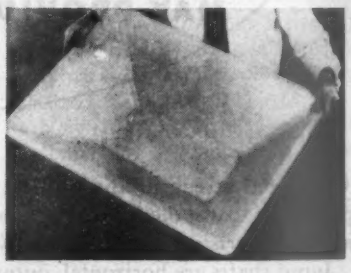
Begins on page 186

6300 degrees F. Constant speed induction motor assures uniform wire feed.

You can spray #15 B. & S. gage wire up to 3/16-in. diameter—from the lowest melting point metal to the highest. Speed is rated up to 18 lb. per hour for aluminum and nickel, up to 80 lb. per hour for zinc. Only one adjustment—for wire speed—is needed.

In spraying 3/16-in. stainless steel, a Mogulectric uses 44 cubic feet of acetylene, 68 cubic feet of oxygen per hour. Air used to atomize and convey the metal is 16 cfm. at 45 psi.

Metallizing Co. of America, 3520 W. Carroll Ave., Chicago 24.



Plastic Mortar Pan

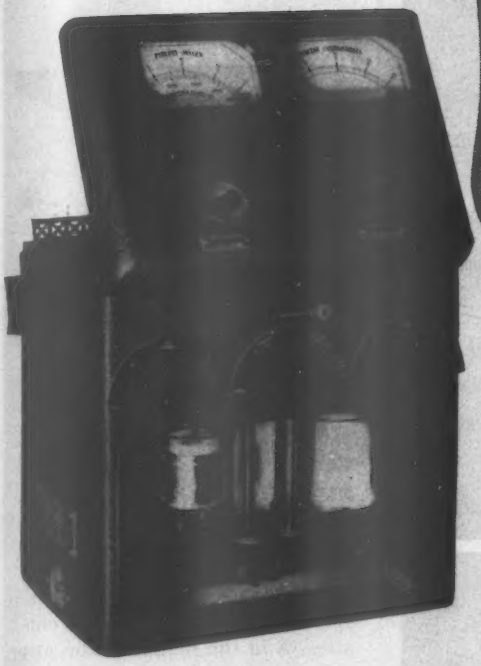
Plastic in this mortar pan makes it 14 pounds lighter than a similar steel model. This flexible mortar dish weighs only 4 pounds. In addition to light weight, it is said to have other useful features that work for your maintenance men rather than against them.

It's easy to remove left over mortar from an Even-Keel pan. You simply flex the upturned tray and the mortar falls away. Maker also claims its narrow shape provides wider passageway for workers on scaffolding.

Joseph M. Taylor Corp., 1 Taylor Drive., E. Providence 14, R.I.

Turn the page

I SPY



Combustion Facts Fully Revealed by Fast, Simple Heat Prover Test

This scientific combustion analyzer—the Cities Service Heat Prover—gives you the real "inside" on furnace combustion conditions. Its plain, quick, accurate work lets you know:

How much excess oxygen is present

How much combustible matter is wasted

How much fuel you might save

Without endless trial-and-error you can proceed to conserve fuel and increase furnace output. This is substantiated by records made on all types of furnaces. See for yourself how productivity can be improved. Call or write *today* for a Cities Service Heat Prover demonstration... readily arranged in your plant. Or for further details return the coupon below.

Not an instrument you buy, but a service we supply. Write or call us today.

THE COMPLETE CITIES SERVICE LINE FOR THE METAL FABRICATING INDUSTRY INCLUDES

- Chillo Cutting Oils
- Trojan Greases
- Trojan Gear Oils
- Pacemaker T Hydraulic Oils
- Optimus Cylinder Oils
- Q-T (Quenching and Tempering) Oils

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

CITIES SERVICE OIL COMPANY
Sixty Wall Tower, Room 144
New York 5, N. Y.

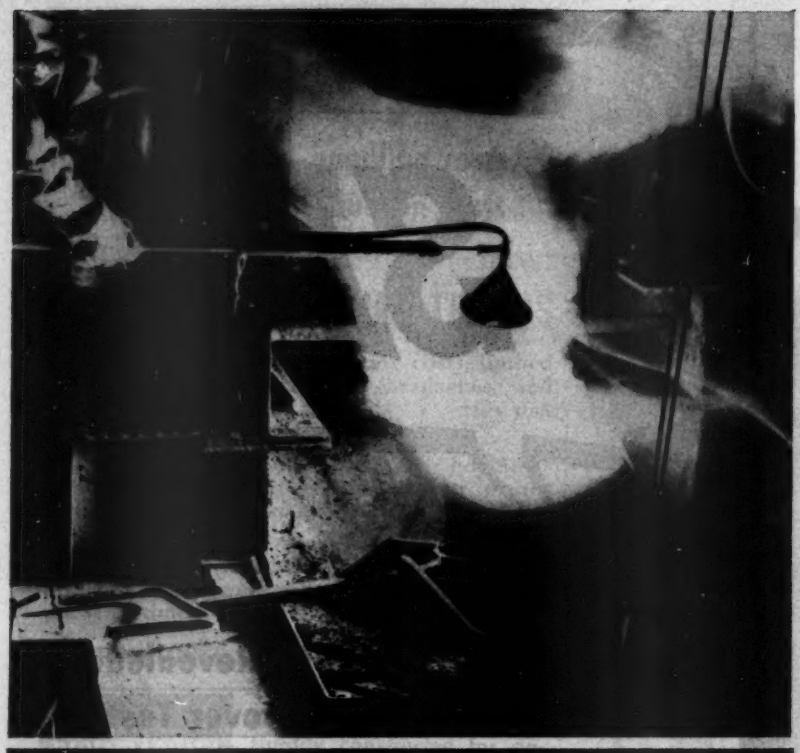
Without obligation please send your booklet, "Combustion Control for Industry" and Heat Prover information.

Name_____

Company_____

Address_____

City and State_____



CONDITIONED AIR REDUCES RISK IN ATOMIC "HOT LAB"

Can you improve your operations with air conditioning?

Industrial research with radioactive isotopes has grown by leaps and bounds. This rapid increase created a greater need for protection from radioactivity. Industrial engineers and atomic scientists at one plant solved this problem with a carefully designed air conditioning system.

Measures taken to prevent contamination consisted of dividing the plant into three major areas, according to the degree of radioactivity: (1) "hot," (2) "semi-hot," (3) "cold." In order to prevent contamination, it was extremely important that direction of air flow be from "cold" to "hot" areas. The air conditioning system installed accomplishes this and also assures the use of 100% outside air, completely avoiding use of recirculated air. The design program for the "hot" area also called for maintenance of 70°F. in the winter, with a relative humidity of 35%. In the summer, temperature varies between 72° and 80°F., while the relative humidity is kept at 50%. As a result, laboratory technicians can carry on their important research in complete safety . . . with an added bonus of comfort.

Today, more and more manufacturers are looking into controlled temperature and humidity, as well as refrigeration, to ease production problems . . . improve products . . . reduce costs. Why not get your engineers' recommendations on air conditioning or refrigeration in your operations? When you do, ask about equipment designed to use "Freon" safe refrigerants. Well known for their safety, efficiency and economy, "Freon" refrigerants are the logical choice in almost all types of installations. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.

Better Things for Better Living . . . through Chemistry

KINETIC
FREON
SAFE REFRIGERANTS

"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 186

Special Vise for Chain Repair

Repair of roller chain can be simpler with a vise specially designed for the job. You can use this model to connect or disassemble single or multiple strand roller chain.

The hardened steel jaws are specially shaped for various chain sizes. And the height of the gripping surface permits the clamping of multiple width chain.

Chain Vise No. 1 is for single strand roller chain from ½-in. through 1-in. pitch, for double pitch chain of 1-, 1¼-, and 1½-in. pitch, and for double strand chain of ½-, ⅝-, and ¾-in. pitch. Vise No. 2 handles single and double-strand chain of 1- through 2-in. pitch.

Baldwin - Duckworth Div., Chain Belt Co., Dept. PR, Plainfield St., Springfield, Mass.

All-Weather Patch for Plant Roads

Winter or summer, you should be able to keep your plant roads in good condition with Komac. It's a bituminous compound that you can pre-mix, stockpile, and then use at a moment's notice for immediate road repairs regardless of weather. You can lay Komac without heating, using standard road-repair equipment.

Koppers Co., Inc., Koppers Bldg., Pittsburgh 19.

Turn the page

New . . . DuraCut Abrasive Discs

1/8" THICK yet flexible

Blending weld on stainless steel tank.

Smoothing weld bead.

IF YOU'RE LOOKING for a BETTER WAY . . .

. . . to blend welds and similar jobs, at a lower cost with greater productivity, investigate the vast possibilities of DuraCut Abrasive Discs. These new multiple layer abrasive discs, are *flexible, strong, safe,* offering many advantages over the ordinary single layer type of coated discs.

Removing rust and scale.

- MAXIMUM FREEDOM OF CHIP DISPOSAL (segment patterned)
- INCREASED LABOR SAVINGS (less disc changing)
- FASTER, SUSTAINED RATE OF CUT (built to grinding wheel specifications)
- 10-25 TIMES LONGER LIFE (over 1/4 million more cutting particles)
- WITHSTAND LONG CONTINUED FLEXING (extra matted reinforcing)

Removing weld spatters.

The only really flexible grinding wheel ever offered!

Order Today for a Trial:

Sizes available for immediate shipment
7 x 1/8 x 7/8 } In any of these
9 x 1/8 x 7/8 } grit sizes: 36, 54, 80

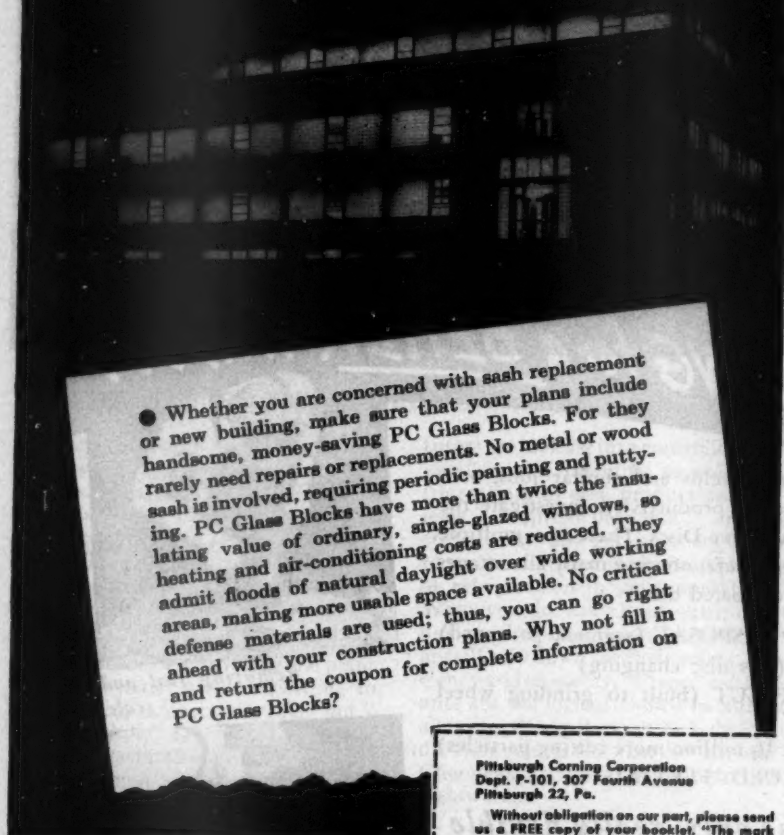
BAY STATE ®

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal Cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ontario

Immediately available...

PC Glass Blocks are the answer to your fenestration problems!



● Whether you are concerned with sash replacement or new building, make sure that your plans include handsome, money-saving PC Glass Blocks. For they rarely need repairs or replacements. No metal or wood sash is involved, requiring periodic painting and puttying. PC Glass Blocks have more than twice the insulating value of ordinary, single-glazed windows, so heating and air-conditioning costs are reduced. They admit floods of natural daylight over wide working areas, making more usable space available. No critical defense materials are used; thus, you can go right ahead with your construction plans. Why not fill in and return the coupon for complete information on PC Glass Blocks?

"PROTECTIVE LIGHTING" at night on surrounding yards is afforded at the Murphy Paint Company Limited, Toronto, Ontario, Canada, by PC *Fractional* Glass Blocks. By day, these glass blocks admit ample daylighting, scientifically directed and diffused. Architect: J. C. Meadowcroft, Montreal, Quebec, Canada.

Pittsburgh Corning Corporation
Dept. P-101, 307 Fourth Avenue
Pittsburgh 22, Pa.

Without obligation on our part, please send us a FREE copy of your booklet, "The mark of a modern building—PC Glass Blocks."

Name.....

Address.....

City.....State.....

PITTSBURGH CORNING CORPORATION
PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

GLASS BLOCKS

The mark of a modern building

Distributed by Pittsburgh Plate Glass Company; W. P. Fuller & Co. on the Pacific Coast; Hobbs Glass Ltd. in Canada; and by leading distributors of building materials everywhere.

WHAT'S NEW IN EQUIPMENT

Begins on page 152

MEASURING & CONTROL APPARATUS

Electrical Tachometer for Motor Drives

The Reeves Pulley Co. has brought out a new electrical tachometer for users of its variable speed transmissions and Vari-Speed Motodrives. It's designed to solve a problem when tachometer must be mounted in inaccessible or remote locations.

Tachometer operates on the a-c generator principle. In most cases you can install it on present Reeves equipment without altering any existing parts.

Reeves Pulley Co., Inc., Columbus, Ind.

●

GAS DUST ANALYZER provides a continuous monitor for boiler and process stacks. It gives you a permanent record of concentration of suspended solids. An alarm warns of excess concentrations. General Power Plant Corp., 381 Fourth Ave., New York 16.

Turn the page

McGRAW-HILL BOOKS are TOOLS

for training and upgrading personnel

in defense production

Check your needs against this representative list of books

1. TOOL ENGINEERS' HANDBOOK, ASTE, $15.00
2. ACCIDENT PREVENTION ADMINISTRATION, Lippert, $2.75
3. METHODS-TIME MEASUREMENT, Maynard, Stegemerten and Schwab, $4.00
4. MATERIALS HANDLING CASE BOOK, Urquhart and Boyce, $8.00
5. MACHINE SHOP ESTIMATING, Nordhoff, $6.50
6. PRODUCTION CONTROL, Moore, $5.50
7. JIGS AND FIXTURES, Colvin and Haas, $4.50
8. SMALL PLANT MANAGEMENT, ASME, $6.00
9. AMERICAN MACHINISTS' HANDBOOK, Colvin and Stanley, $8.00
10. VITALIZING THE FOREMAN'S ROLE IN MANAGEMENT, Gardiner and Gardiner, $4.00
11. INSPECTION ORGANIZATION AND METHODS, Thompson, $5.00
12. ENGINEERING ORGANIZATION AND METHODS, Thompson, $4.50
13. TIMESTUDY FUNDAMENTALS FOR FOREMEN, Carroll, $3.00
14. DIE CASTING, Doehler, $8.00
15. HOW TO CHART TIMESTUDY DATA, Carroll, $5.00
16. QUALITY CONTROL, Feigenbaum, $7.00
17. THE FOREMAN'S HANDBOOK, Heyel, $5.00
18. MECHANICAL ENGINEERS' HANDBOOK, Marks, $15.00
19. PRODUCTION PLANNING AND CONTROL, Landy, $5.50
20. PRACTICAL IDEAS FOR MACHINISTS, Linsley, $4.50
21. LAYOUT PLANNING TECHNIQUES, Immer, $5.50
22. PLANT ENGINEERING HANDBOOK, Staniar, $15.00
23. HOW TO SUPERVISE PEOPLE, Cooper, $2.50
24. MATERIALS HANDBOOK, Brady, $8.50

DEFENSE production needs have put the spotlight on today's rapid technical developments—in machines, materials, processes, and management. New demands for know-how and skill face your personnel, from top engineering design on down through the many levels of supervisory and mechanical shop work.

Make sure you get maximum efficiency and production from your whole staff—give them the advantages of the technical training and upgrading afforded by McGraw-Hill books.

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☐ SEND YOUR REPRESENTATIVE to call on our Training Director.

☐ SEND ME BOOKS according to numbers encircled below, for 10 days' examination on approval. In 10 days I will pay for books I keep, plus few cents for delivery, and return others postpaid.

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7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24

(Print) Name .....

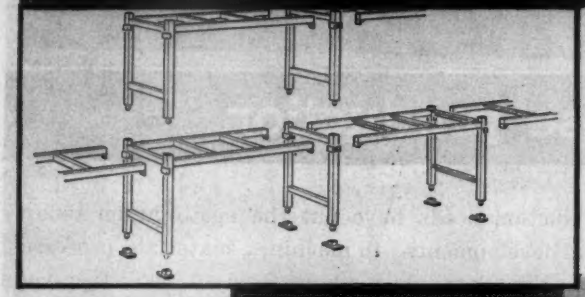
Address ..... City ..... Zone ..... State .....

Company ..... Position ..... Fac. 10

Keep your Storage Area Flexible

with

MHS COLLAPSIBLE PALLET RACKS



Method of assembling a bank of MHS Collapsible Pallet Storage Racks

MHS Collapsible Pallet Storage Racks in a warehouse

You can set up MHS Collapsible Pallet Storage Racks easily and quickly anywhere in the plant or warehouse. It takes only two men and they needn't be skilled.

You can add any number of units longitudinally and one or more tiers vertically at any time.

You can move these racks from place to place without damage. They never become obsolete.

Write for prices and specifications.

Mechanical Handling Systems, Inc.

4600 NANCY AVE. • DETROIT 12, MICH.

Offices in Principal Cities

In Canada: Canadian Mechanical Handling Systems, Ltd.

Begins on page 152

PLANT HOUSEKEEPING

One-Man Snow Plow

It's not too early to start thinking of the winter's snows, and how to get them away from your door. This rotary plow is one solution for clearing crosswalks and stretches of road. Maker says it will do one hour's snow shoveling in ten minutes.

The Jari, Jr., a self-propelled unit, cuts a swath 16 inches wide. An adjustable casting chute throws the snow out of the way.

Unit has 1½-hp. gasoline engine, rubber tires. Weighs 157 lb.

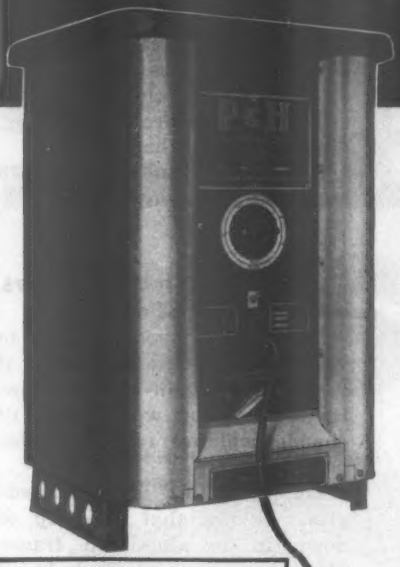
Jari Products, Inc., 2938 Pillsbury Ave., Minneapolis 8.

•

BARRIER CREAM PROVIDES a protective film for workers' hands. You just rinse hands in water to remove grease, paint, lacquers, or ink. No gritty soaps or harsh solvents needed. Film is not sticky, leaves no residue according to maker, Ottawa Engineering & Sales Co., 14164 Ironwood Dr., Marne, Mich.

Turn the page

THAT P&H AC WELDER LOOKS GOOD TO ME, JIM. WE CAN GET IT OFF THE FLOOR —AND HAVE MORE ROOM TO WORK!
THAT'S RIGHT, BILL— AND WITH CONTROL AT THE WORK WE GET MORE DONE, AND DO IT BETTER!



Save floor space, cut welding time for more production at lower cost

. . . . use P&H AC Arc Welders with exclusive Dial-lectric remote control

Give yourself more room for your production needs. Mount your P&H Welder off the floor, out of the way.

Dial-lectric remote control lets you do this. Your operator can turn the heat on *at the work.* It also cuts down his "walking time" . . . turns it into *welding* time for increased output.

Besides saving space P&H Dial-lectric control eliminates cores, coils, sprockets, gears and other moving parts that cause excessive maintenance and downtime.

P&H AC Welders are available in a full range of sizes up to 625 amps. See your P&H representative or distributor for full details on how this outstanding welder can save you time and money.

P&H

WELDING DIVISION
4525 W. National Avenue
Milwaukee 14, Wis.

HARNISCHFEGER

Excavators • Overhead Cranes • Hoists • Arc Welders and Electrodes • Soil Stabilizer • Crawler and Truck Cranes • Diesel Engines • Cane Loaders • Pre-assembled Houses

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Specialized Training

Metal Welding Fabrication

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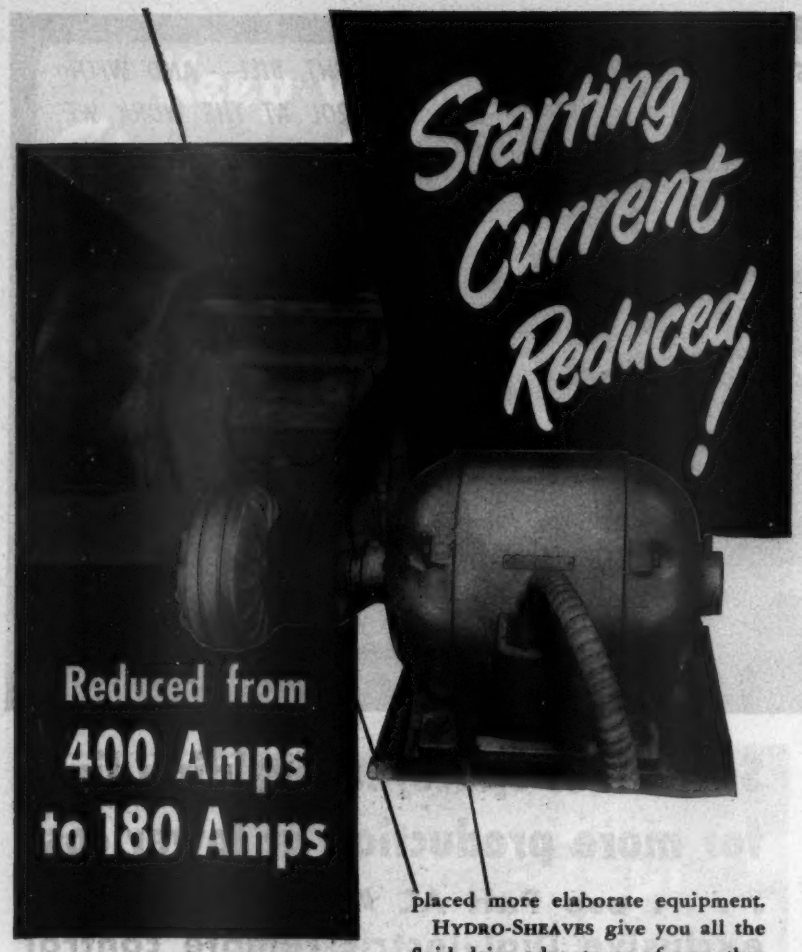

Twin Disc HYDRO-SHEAVE Drive

A material *reduction in current demand* for starting heavy loads is one advantage many plants report from the installation of Twin Disc HYDRO-SHEAVE Drives.

Take this cullet crusher operated by Diamond Glass Company, Royersford, Pennsylvania. Starting current was reduced from 400 amps to 180 amps. Running current was reduced from 40 amps to 18 amps. Moreover, a 15 hp motor replaced the original 25 hp—and a plain across-the-line starting switch replaced more elaborate equipment.

HYDRO-SHEAVES give you all the fluid drive advantages of smoother operation, smoother acceleration, overload protection, *plus* the probability of reducing starting current demand and *matching motor to running load* instead of starting load.

These drives slip right on over the motor shaft—in a few minutes—with sheave or sprocket adjacent to the engine bearings so that no additional side pull is imposed.

Perhaps a Twin Disc HYDRO-SHEAVE Drive can help you *improve your power factor.* See your Twin Disc Hydraulic Dealer, or write direct for Bulletin No. 145-B, and Installation Reports Nos. 1 through 14.

Clutches & Hydraulic Drives

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

Begins on page 152

SAFETY

Foil Curtain Protects Workers From Radiant Heat

Ray-Foil is a curtain of foil cloth that reflects radiant heat like a mirror reflects light. You can use it to screen uncomfortable heat from workers operating around furnaces, kilns, etc.

Maker says actual tests showed a temperature of 100 degrees F. on one side of a Ray-Foil curtain, while the temperature on the other side was 2000 degrees F. The flexible cloth comes in rolls for use as drapes, curtains, shields or glare baffles.

Safety-First Supply Co., 425 Magee St., Pittsburgh 19.

Quick-Lift Window Takes Welder Out of the Dark

No need for your welder to swing back his welding hood, if he's using a Quik-Lift Window. He can position work pieces or change welding rods with his helmet on.

The Quik-Lift is a smoked-glass window that rides up or down in an aluminum frame. Movement is controlled by a mouthpiece inside the hood. The welder blows into the mouthpiece to raise the glass, sucks in on the mouthpiece to drop it. According to the maker, Quik-Lift will fit any welding hood. Price: $17.

Argyle Mfg. Co., Colchester, Ill.

•

SAFETY ROPE resists electric shock even after it has been doused with water. This manila rope has high dielectric strength, and is processed to shed water. South-Eastern Cordage, 648 N.B.C. Bldg., Cleveland 14.

Turn the page

STOP RUST WITH RUST-OLEUM

Why let rust—the most destructive enemy of American [illegible] —rob you of [illegible] to-repl[illegible] stacks, [illegible] fire escape[illegible] equipment[illegible]

Use RUST-OLEUM [illegible] plant to protect [illegible] For 25 years RUST-OLEUM has proved its capacity to stop rust for many nationally known manufacturers. Its tough, pliable, rust-resisting film gives excellent protection that prevents rust losses under many difficult rust-producing conditions—salt air, dampness, industrial fumes, and general weathering.

RUST-OLEUM can be applied *even* over rusted surfaces. It is not necessary to remove all the rust. Just remove scale and loose rust, [illegible] and wire [illegible] rust problems and help you develop a program of plant-wide rust control to defer many costly replacements — to conserve the available supply of new metal for national defense.

Industrial Distributors in principal cities of the United States and Canada carry complete stocks for immediate delivery. Plan your needs—order *now!* See our complete catalog in *Sweet's* which also tells the nearest source of supply. Or, write on your company letterhead for full information.

"RIGID ECONOMY, MON!"

Available in many COLORS aluminum and white

Beautifies as it Protects

RUST-OLEUM CORPORATION
2453 Oakton Street, Evanston, Illinois

for
custom-engineered
POWER

look to... EP

Since 1909, the job of The Electric Products Company has been to create and develop special electrical rotating equipment . . . motors and generators to do existing jobs better or to reach into new fields to do jobs that couldn't be done before. The natural "by-product" of our more than 40 years of specialization is that you get equipment designed and built to the exact requirements of your application . . . equipment that has greater dependability, longer life and that requires less maintenance.

Send in the coupon below for detailed information about our Custom-Engineered synchronous motors and generators . . . d-c motors and generators . . . induction motors . . . battery chargers . . . frequency changers.

A nation-wide sales engineering and service organization stands ready to meet all User requirements.

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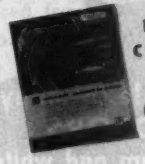


1728 CLARKSTONE ROAD
CLEVELAND 12, OHIO

Attach coupon to your letterhead for your copy of Bulletin 2-200

NAME_____
TITLE_____
COMPANY_____
STREET_____
CITY_____ ZONE____ STATE_____
X-74

MISCELLANEOUS

Two-Way Industrial Radio

This low-power 2-way radio may help you control operations in your plant. The unit meets FCC regulations for 2-way radio communications carried on within a single plant area. Maximum power input to the final amplifier is under 3 watts.

You can install a low-power Uni-Channel either as a base station or as a mobile unit. It's ideal for central office control of fork trucks and other plant vehicles.

The compact transmitter-receiver unit comes either as a single package with built-in speaker and control head, or with individual speaker and control. You can get a model for operation on 6- or 12-volt d-c, or 117-volt a-c.

Motorola, Communications & Electronics Div., 4545 W. Augusta Blvd., Chicago 51.

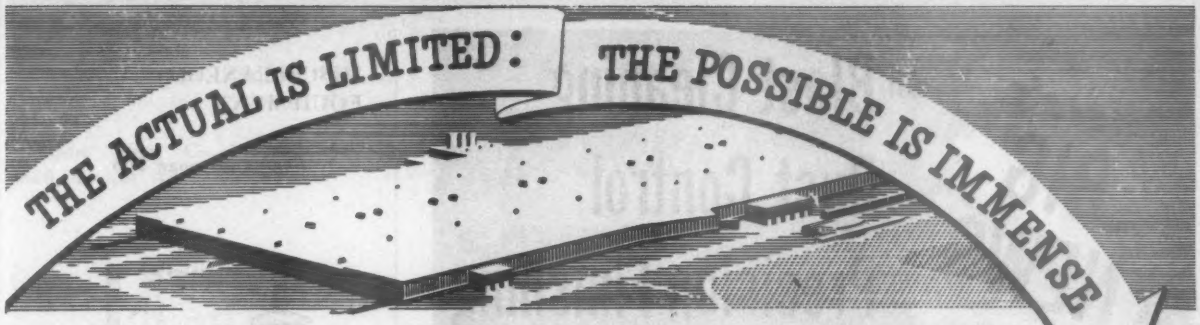
Fluorescent Fixtures You Lower to Clean

Why go up to fluorescent fixtures to clean them, asked the Thompson Electric Company, when you can bring them down to a convenient working level. So they developed a unit that does just that.

Their device drops any fluorescent fixture down from the ceiling by cable. Fixture is counterbalanced. So you can stop it at any convenient height for cleaning and relamping.

The Thompson Electric Co., 1111 Power Ave., Cleveland 14.

Turn the page



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1951

HOW ECONOMIES OF WELDED STEEL CUT YOUR PRODUCTION COSTS

WHEN designs utilize the economies of welded steel construction, invariably costs are less. That's because fewer pounds of less costly material are needed . . . Each pound of metal can be more easily concentrated where it does the most good.

Wherever costs are higher, inevitably the designs have fallen short of embodying the potential savings, or the products themselves have been overdesigned. A careful reappraisal by the shop before a design is "frozen" simplifies construction details and eliminates every unnecessary expense for lowest cost of manufacture.

Your Lincoln Welding Engineer will gladly help you analyze your designs and point out various cost reduction possibilities. Simply call or write.

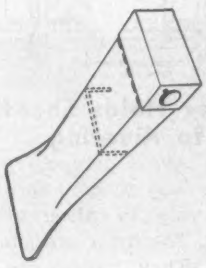


Fig. 3. Saves 51% Cost *by forming lever arm and pad as integral piece from 10 gauge metal. Weighs 2.5 pounds.. costs 54¢.*

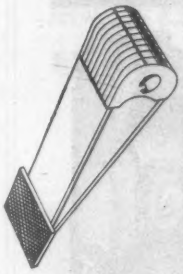


Fig. 4. Saves 67%, Eliminates Broaching. *Hub with integral key is produced by stacking stampings in assembly. Arm is 10 gauge, brake formed and welded to hub. Cost is only 31¢. . . weight 2.2 pounds.*

the ACTUAL

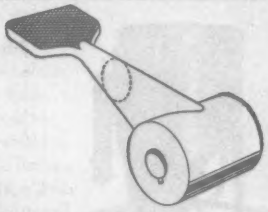


Fig. 1. Traditional Construction. *Machine foot-lever, 10 inches long, weighs 6 pounds. Cost with broached keyway is $1.15.*

increasing the YIELD

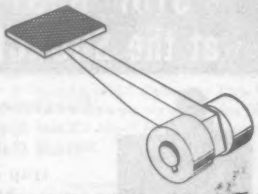


Fig. 2. Simple Steel Design Costs 34% Less. *Can be built by the shop with only saw and shears. Weighs 2.7 pounds . . . costs 68¢ complete with keyway.*

the IMMENSITY of the POSSIBLE

Unlimited opportunities to create efficient, lower cost designs.

SEE HOW STEEL BUILDS IT WITH LESS MATERIAL

Machine Design Sheets are available to designers and engineers. Simply write on your letterhead to Dept. 277,

THE LINCOLN ELECTRIC COMPANY

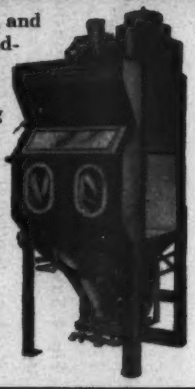
CLEVELAND 1, OHIO

Here's BIG NEWS on Blast Cleaning Dust Control Precision Finishing

Blast Cleaning Unit is PORTABLE!

Ideal for maintenance and many other jobs, including removal of rust, dirt, scale, etc. Economically cleans large objects like tanks, bridges, structural work before painting. Six sizes, stationary or portable, from . . . . . $170.00 and up

Hydro-Finish SPEEDS POLISHING!

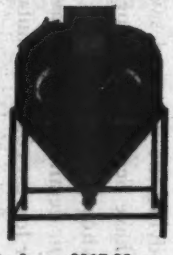


Removes scale, and directional grinding lines . . . prepares surfaces for plating and holds tolerances to .0001"! Liquid blast reduces costly hand cleaning and finishing of molds, dies, tools, etc. Models from $1295.00 and up

STOP DUST at the SOURCE!

Pangborn industrial type Unit Dust Collectors trap dust at source. Machine wear is minimized, housekeeping and maintenance costs reduced. Solves many grinding and polishing nuisances and material losses. Models from $286.00 and up

COMPACT Blast Cabinet for SMALL WORK!



Ideal for producing smooth, clean surfaces on pieces up to 60" x 36" in size. Cleans metal parts, removes rust, scale, grime, dirt, paint, etc., in a few seconds. Saves money all year 'round. Models from $315.00 up

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control Equipment

Pangborn MAIL COUPON FOR DETAILS

Check for more information
- ☐ Blast Cleaning Cabinets
- ☐ Blast Cleaning Machines
- ☐ Unit Dust Collectors
- ☐ Hydro-Finish Cabinets

PANGBORN CORP., 2100 Pangborn Blvd., Hagerstown, Md.
Gentlemen: Please send me more information on the equipment I've checked at the left.

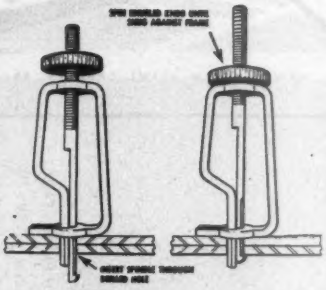
Name.....

Company.....

Address.....

City.....Zone....State.....

Begins on page 206



Gripper Holds Sheets Prior to Riveting

These Avdel grippers provide a simple way to hold sheetmetal parts firmly in place prior to riveting. The units are simple to operate. They require no other parts or tools. The Avdel gripper remains firmly in place, even in oversize holes. It's good for blind-hole applications, too.

Surface area at contact points is large. Holes are completely filled but not enlarged, says maker. Available in 3/32-, 1/8-, 5/32-, and 3/16-in. hole sizes.

Aviation Developments, Inc., 210 North Front St., Burbank, Calif.

Hand Cutter for Flat Steel Strapping

This Acme strap cutter will snip flat steel band up to ¾-in. wide by 0.035-in. thick. Band guide prevents straps from wedging sidewise between the blades. Flat lower blade permits easy insertion beneath tensioned straps

on bales, bundles, and cartons. Forged steel tool weighs one pound.

Acme Steel Co., Dept. 30P, 2840 Archer Ave., Chicago.

Arc Disintegrator for Removing Broken Taps

The M-7 Tapmaster removes broken taps, drills, etc., by disintegrating them. An electric arc eats away the broken tool without damaging hole threads. A pumped coolant washes away metal particles. You can also use the Tapmaster for cutting keyway slots, and repairing and altering molds and dies.

The unit has 28 inches of table clearance, and 5 feet of work clearance from the floor. An adjustable back break permits corner drilling and drilling holes at any angle up to 45 degrees.

Flox Corp. of Michigan, 740 N. Rochester Rd., Clawson, Mich.

•

NYLON-METAL SCREWDRIVER starts slot-head screws in hard-to-get-at locations. Center section of 2-piece blade rotates in slot to hold screw firmly in place at the end of the screwdriver. Bonney Forge & Tool Works, Durham & Meadow Sts., Allentown, Pa.

Turn to page 370

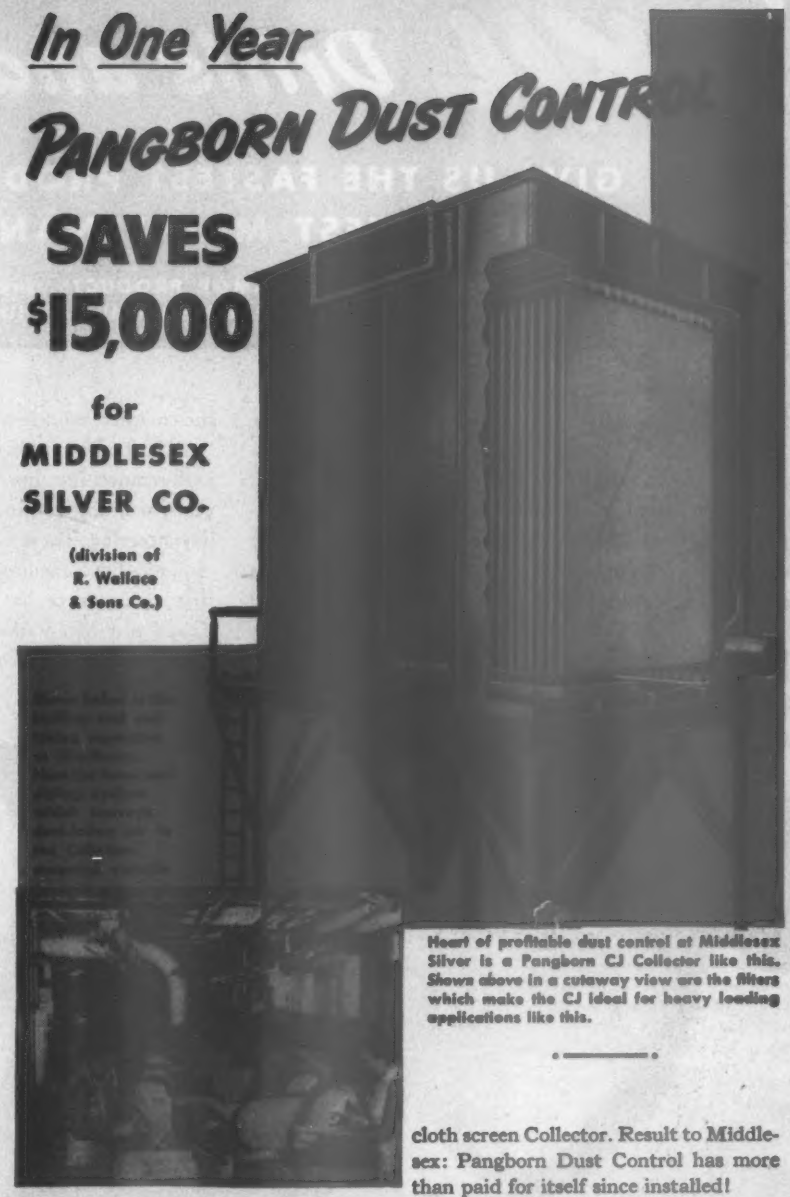
In One Year

PANGBORN DUST CONTROL

SAVES $15,000

for MIDDLESEX SILVER CO.

(division of R. Wallace & Sons Co.)



Heart of profitable dust control at Middlesex Silver is a Pangborn CJ Collector like this. Shown above in a cutaway view are the filters which make the CJ ideal for heavy loading applications like this.

Pangborn Dust Control recovers valuable silver from plant dust!

Talk about profit! Every year Pangborn Dust Control at Middlesex Silver earns a profit of $15,000 after *all operating expenses* are paid! Centrifugal collectors are used to trap coarse dust particles . . . and *high efficiency is assured* because valuable silver fines are recovered by the big Pangborn CJ cloth screen Collector. Result to Middlesex: Pangborn Dust Control has more than paid for itself since installed!

Pangborn has a complete line of Dust Collectors, each designed for a specific job. No matter if the dust in your plant is *valuable, hazardous, or just a nuisance* . . . chances are Pangborn Dust Control will *save you money.* Find out . . . there's no obligation. For full information, write today for Bulletin 909A to PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the Latest Developments in Dust Control and Blast Cleaning Equipment

PANGBORN DUST CONTROL

STOPS THE DUST HOG from stealing profits

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Drills and Drivers

GIVE US THE FASTEST PRODUCTION WITH THE LOWEST MAINTENANCE COSTS,"

says Mr. N. Y. Starke, *President*, NAMOR PRODUCTS, Inc., *Cleveland, Ohio*
Manufacturers of the Namor dinette line.

SKIL Drills and SKIL Drivers prove their efficiency and economy all along the production line of Namor Products, Incorporated, manufacturers of widely-known dinette furniture. The drills are used singly or in multiples of three or four to bore more than 600 holes every day through the Formica tops and wooden bases of the table leaves. The drivers attach hardware to the underside of the tables and complete the assembly of the tubular chairs.

SKIL Tools have been on this job with top performance for more than two and a half years, working continuously hour after hour, day after day. These hard-working tools have required little maintenance and the cost of that maintenance has been remarkably low. That's why Mr. Starke says, "We enthusiastically endorse SKIL Tools."

3 AT A TIME . . . 4 AT A TIME

SKIL Drills in SKIL Bench Stands bore clean and accurate holes through wood and Formica for insertion of dowel pins in the table leaves. Namor Products, Inc., uses seven Model 241 SKIL Drills, endorses the smooth-running, reliable service they give.

SKIL DRILL—MODEL 241
One of 26 SKIL Models

¼" special duty drill. Capacity: 0" to ¼" in steel; 0" to ½" in hardwood. Speed: 2250 r.p.m. no-load. Overall length: 11¼". Weight: 4¾ pounds.

SKIL Bench Stands quickly convert any SKIL Drill into a stationary drill press.

"EASY TO USE... EASY TO HANDLE"

SKIL Drivers—12 of them—speed assembly. These drivers are compact for easy one-hand operation, so light in weight that handling doesn't tire the operator. The adjustable clutch is quickly set to uniform, pre-determined tension and eliminates excessive shock of sudden stops.

SKIL DRIVER—MODEL 303
One of 20 SKIL Models

Capacity: ¼" diameter machine screws, nuts; No. 12 self-tapping screws. Speed: 750 r.p.m. no-load, standard: speed of 1000 and 1250 r.p.m. at no extra cost. Overall length: 11⅛". Weight: 3¾ pounds.

MODEL 489—Similar to Model 303 but with reversing switch.

See your SKIL Distributor for demonstrations and complete information

SKIL Products are made only by SKILSAW, Inc.
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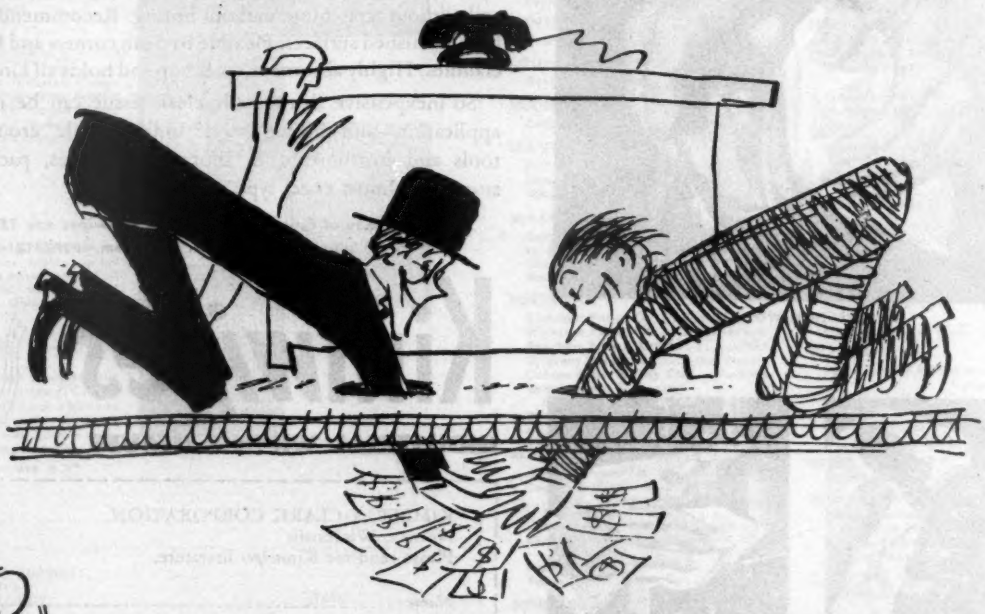

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SIGNIFICANT DEVELOPMENTS IN PRACTICAL LABOR RELATIONS

. . . told in brief for busy factory executives

By PAUL A. KING, *Assistant to Vice President for Personnel, Bigelow-Sanford Carpet Company, Inc. Member, New York Bar.*

GENERAL ASSESSMENTS ARE NOT PERIODIC DUES. *The distinction makes a lot of difference. It can mean a new representation election in your plant* . . . . . **Page 216**

CAN UNION POST NOTICE OF STRIKE MEETING? *Sure can, says one arbitrator, unless your contract is phrased exactly right* . . . . . **page 218**

UNION'S VIEW HELPS WIN WAGE SUIT FOR EMPLOYER. *A district court judge adds another factor in determining the supervisory status of an employee for Wage-Hour purposes. What does the union think?* . . . . . **Page 218**

WHEN IS A TRAVELING EMPLOYEE WORKING? *The Wage-Hour Division announces some rules in figuring out the overtime of these employees* . . . . . **Page 220**

"PICKER AND CHOSER" LOSES UNEMPLOYMENT PAY. *A woman was denied unemployment pay because she wanted a particular shift—where work was not available* . . **Page 220**

RETIRED EMPLOYEES ABROAD COLLECT SOCIAL SECURITY. *They don't have to stay in the USA when they retire. But the rule does not apply to all foreign countries* . . . **Page 221**

PREMIUM OVERTIME PAY HERE TO STAY. *If you were one of the defense contractors hoping that it would be eliminated, your hopes will be dulled as a result of a statement made by Defense Mobilizer Wilson* . . . . . **Page 221**

WAGE-HOUR MINIMUMS FOR COMBINATION RATE WORKERS. *These workers present a special problem. The Wage-Hour Administrator has worked out the answer for you* **Page 222**

RIGHT TO LOCKOUT BY ASSOCIATION MEMBER DECIDED AGAIN. *This oldy has been decided upon by a court of appeals—in favor of the employer association member, but the final score isn't in yet on this tough question* . . . . . **Page 222**

BRIEF—BUT IMPORTANT. *The child labor provisions of the Walsh-Healey Act take a heavy toll . . . Grievance must be in writing or it isn't any good . . . In an overtime suit, a "working foreman" can inspect his time records . . . There's a limit to what a worker must put up with . . . Severance pay for long service employees is OK* . . . . . **Page 224**

General Assessements Are Not Periodic Dues

A lot of unions—and many employers, too—may have to get used to a change of scenery around the plant—as the result of a new NLRB ruling. A lot of unions may be "out" and new ones "in." Here's the story:

Under the contract between the International Harvester Co., (Louisville, Ky.) and the United Auto Workers (CIO), no employee was allowed to work unless he paid current monthly dues, *general assessments*, and initiation fees required by the union.

Two unions had been trying to displace the UAW. They seized on this clause to get a representation election. Said the clause was illegal, and pointed out that under Taft-Hartley Act you can't discriminate against a worker for not belonging to the union for any reason other than the nonpayment of "periodic dues and initiation fees."

An illegal clause, they argued, removed the bar of the existing contract.

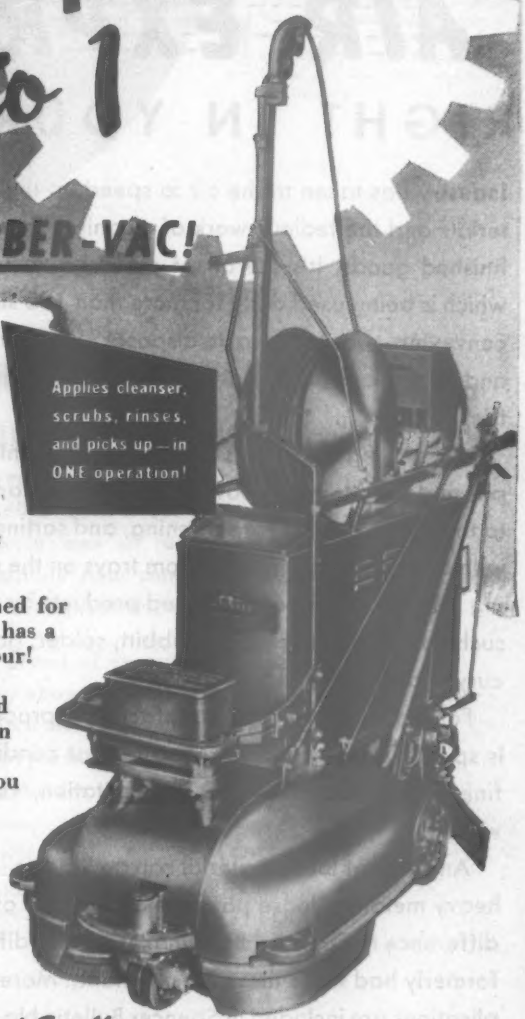
It isn't illegal, said the UAW—and IH joined in this response.

But the NLRB paid no attention to the UAW and IH. It ruled that general assessments are *not* periodic dues. An employer would not be permitted to fire a worker for failure to pay general assessments. And that being the case, the existing UAW contract was not a bar to an election.

Turn the page

MECHANIZE 4 Scrubbing Operations into 1

with a COMBINATION SCRUBBER-VAC!



Here's a timely answer to the need for conserving manpower and reducing labor costs—*a single cleaning unit that completely mechanizes scrubbing.* A *Combination Scrubber-Vac* applies the cleanser, scrubs, rinses if required, and picks up (damp-dries the floor)—*all in one operation!* Maintenance men like this *four-in-one feature;* also the fact that the machine is *self-propelled* . . . has a *positive* clutch . . . new type of water valve that *assures* uniform flow of water . . . and powerful (quiet) vac for efficient pick-up.

The *Scrubber-Vac* shown at right, *Model 213P,* is designed for heavy duty scrubbing of large-area floors. This machine has a 26-inch brush spread, and cleans up to 8,750 sq. ft. per hour! (Powder dispenser is optional.) *Finnell* makes *Scrubber-Vac Machines* in a full range of sizes—for small, vast, and intermediate operations. From this complete line, you can choose the size that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that you can lease or purchase a *Scrubber-Vac,* and that *there's a Finnell man nearby* to help train your maintenance operators in the proper use of the machine and to make periodic check-ups.

For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2510 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

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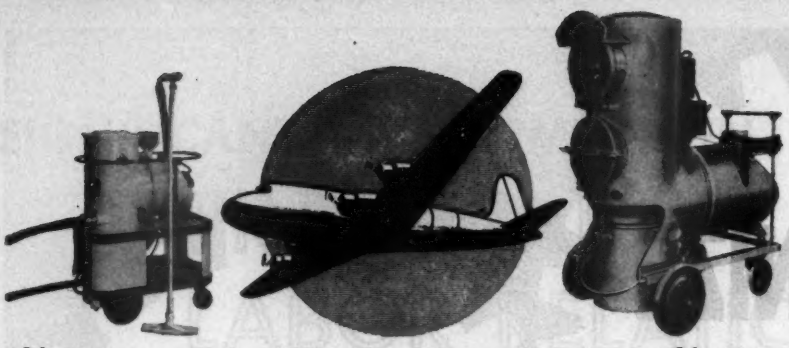

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A daytime production tool with 100 uses. At night, Spencer machines like these clean thousands of acres of industrial floor space.

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RIGHT IN YOUR PLANT

Industry has taken to the air to speed up the movement of raw materials and the tedious work of cleaning, inspection and packing of finished goods. It's the air of powerful vacuum—Spencer Vacuum which is being used daily for more than 100 startling applications for conveying, recovery, waste disposal, automatic dust-free production and sanitation, particularly in the food, chemical and metal industries.

It is moving mountains of rice from freight cars, hot fly ash from pits and sand from the bowels of ships. It is carrying tons of chemicals to the top of a plant for screening, and sorting operations by gravity with a final vacuum pickup from trays on the ground floor. It is picking metal chips out of machined products by the ton and recovering such valuable materials as babbitt, solder, gold, enamel dusts, mercury and solder flux.

For the more delicate manufacturing processes, Spencer Vacuum is speeding bench work, reducing dust conditions and cleaning the finished products. In food it's sanitation, vermin control and conveying.

Any kind of loose material can go "by air" the Spencer way. From heavy metals to loose powders and liquids of all kinds—it makes no difference to Spencer. But it makes a lot of difference to the men who formerly had to do these jobs by hand. More than 100 essential applications are included in Spencer Bulletin No. 144.

427-F

THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER HARTFORD

PRACTICAL LABOR RELATIONS

Begins on page 216

Can Union Post Notice of Strike Meeting?

One arbitrator, at least, feels you can't deny a union the right to post notices on your bulletin boards announcing a strike meeting—even if the contract says you must approve notices.

The best of clauses often go to arbitration. That's where trouble may crop up.

For example: Fairchild Engine & Airplane Corporation, Hagerstown, Md., gave the union the right to post announcements of union meetings—*if* company approval was given. When a notice of a union strike came along, the company refused approval. *Reason:* The notice mentioned the possibility of a strike. Fairchild argued that the contract didn't allow the union to state the *purpose* of the meeting. The argument went to arbitration.

The arbitrator ruled *for* the union. Said the statement of purpose was part of the notice of the meeting.

Union's View Helps Win Wage Suit for Employer

A New York District Court Judge adds another factor in determining whether an employee is exempt under the Wage-Hour law as a supervisor: How does the union feel about it?

In the case before the court, a union representative testified that the employee who was bringing the wage suit was questioned about his status. He told the union—and the union went along with his point of view—that he was a foreman. The judge took this into consideration. (*Kupperman*).

Turn the page

N-B-M Meadville . . . a plant that's worth seeing! Visits from Blast Furnace Superintendents and other Steel Mill Officials are welcome. When can you make an inspection trip?

why did this slipper ELIMINATE 2 OUT OF 3 REPLACEMENTS?

How an alloy developed by N-B-M Research resulted in 1 slipper with the service life of 3

One of the toughest applications you'll find for testing the mettle of a bronze alloy is Blooming Mill Slippers . . . they take the shock, stresses and frictional wear of the mill driving universals. As an example of the tough service involved, aluminum bronze slippers formerly used in a large Eastern steel company's blooming mill averaged just 3 months' service life before wearing out.

Our engineers suggested a change to N-B-M Alloy 10-B—a Bronze specially developed by National Bearing Research, for this purpose.

Result? **Slippers cast from this N-B-M Alloy averaged 9 months of service instead of 3 . . . eliminated 2 out of 3 replacements! Performance was so far superior that this steel company now standardizes on N-B-M Slippers throughout the mill.**

We're proud of examples like this . . . because they show how effectively our facilities for Research and Engineering—combined with 78 years of practical experience—make money-savings solutions to problems on . . .

- Slippers
- Roll Neck Bearings
- Housing Nuts
- Bronze Bars
- Babbitt Metals
- Tuyeres
- Tuyere Coolers
- Valves
- Valve Seats and Plugs
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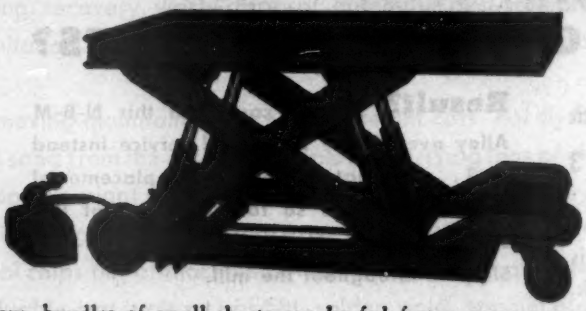
with the RAYMOND Hydraulic

Scissors-Type **SHEET FEEDING TABLE**



Now, bundles of small sheets can be fed faster, more accurately with the new *Raymond* Scissors-Type Sheet Feeding Table.

Only 66" long, it has a scissors-type lifting mechanism that elevates the top from 18" to 36", enabling it to hold thick bundles for feeding. The top can't sag under off-center loads because it's supported at four points by Hydraulic rams.

With *Raymond* Scissors-Type Sheet Feeding Tables, manual lifting is banished—the operator merely slides sheets to presses, shears or brakes. Single speed foot pump or power operated pump raises table. Capacities: 6,000 or 10,000 lbs.

FREE BULLETIN Send for Bulletin 261, Supp. 3—it gives complete details.

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PRACTICAL LABOR RELATIONS

Begins on page 216

When Is a Traveling Employee Working?

Defense production is keeping a lot of employees on the road—on company business. For the benefit of a company whose employees spend time on trains, the Wage-Hour Division listed some rules for figuring hours worked. Briefly:

(1) Count hours corresponding to the employee's usual hours of work.

(2) If he works on Saturdays, Sundays or holidays, count the time that corresponds to his usual hours of work—on a weekday.

(3) Count sleeping time (11 P.M. to 7 A.M. for enforcement purposes) — *unless* employee gets price of a berth and he is able to occupy it long enough to get a "reasonably appreciable" benefit;

(4) Don't count legitimate meal periods;

(5) Don't count free or relaxation time on a week end—if the employee has no responsibilities then.

"Picker and Choser" Loses Unemployment Pay

Can a worker make up her mind to take only the second and third shifts, and then collect unemployment pay when only first shift work is available? The answer is no, in Connecticut, at least.

The woman in this case had worked for the company for three years. In this period she was on the third shift—midnight to 7 A.M.—and on the second shift—3:30 P.M. to midnight. She quit to have a child. Seven months later she applied for second and third shift work only. "Home

responsibilities," she said, kept her from working the first shift—the only work available. No unemployment pay for her. Hers was not a reason associated with employment, the Connecticut authorities ruled.

Retired Employees Abroad Collect Social Security

This question has frequently been asked by retiring employees: Can I go to live in "the old country" and still collect my social security?

As a rule, the answer is yes. Even if they are not U. S. citizens, the answer is yes. But the answer is no if they go to Albania, Bulgaria, Czechoslovakia, Estonia, Latvia, Lithuania, Poland, Rumania, the Soviet Union, or the Russian sections of Berlin and Germany. The Treasury Department has suspended payments to residents of these countries.

Suppose the retired employee earns more than $50 in a month while abroad? If he is an American citizen working for an American company he will lose benefits for that month (doesn't apply however if he works for a foreign subsidiary of an American company). But if he is an alien, it doesn't matter whom he works for. He still gets social security.

Premium Overtime Pay Here to Stay

Many defense contractors have hoped that premium pay for overtime would be done away with as part of the "emergency." Defense Mobilizer, Charles E. Wilson, has helped bury that hope by announcing his approval of present overtime practices. He voiced his opinion for the benefit of procurement agencies, their field purchasing agents, and their defense contractors.

In Wilson's book, premium pay for overtime is *not* inflationary. The additional labor cost is more than offset by economies in machine operation and overhead costs. Besides, use of experienced workers brings about savings, he claims.

Turn the page

How to S-T-R-E-T-C-H *your warehouse*

GAIN UP TO ⅓ MORE STORAGE FROM EXISTING STORAGE FACILITIES

with the RAYMOND SPACEmaker ELECTRIC TIERING TRUCK

Now you can narrow your aisles—add more rows of storage—right in your present plant or warehouse by using the new *Raymond* SpaceMaker. This revolutionary rider-type truck actually right-angle tiers loads 130" high from aisles only 6-ft. wide—half the width required by conventional tiering trucks! Here's what the SpaceMaker does:

• **STACKS FROM 6-FT. AISLES**
Exclusive *Raymond* design eliminates counterweight, shortens overall length. Result: SpaceMaker stacks loads from 6-ft. aisles—gives you one extra row of storage for each 10 to 12-ft. aisle now used.

• **MANEUVERS LIKE MAGIC**
Offset drive wheel produces 200° turning arc—enables SpaceMaker to maneuver in aisles narrower than its own length with load.

• **WEIGHS SO MUCH LESS**
Compact construction plus no counterweight result in far lighter truck. Thus, SpaceMaker operates in low-capacity elevators, on lighter-capacity floors — has lower battery capacity requirements, costs less to run.

SpaceMaker Model E2ST
Straddle type, telescopic tiering truck. 2000-lb. cap

• **GET ALL THE FACTS**
Send for Bulletin 703 today. And ask for a SpaceMaker demonstration—you have to see it to believe it!

Ease Peak Period Handling
Raymond Hydraulic Pallet Lift Trucks lighten rush hour handling, speed up short hauls—release power trucks for long hauls and tiering. Write for Bulletins No. 222 and 223.

Pioneers since 1840
RAYMOND

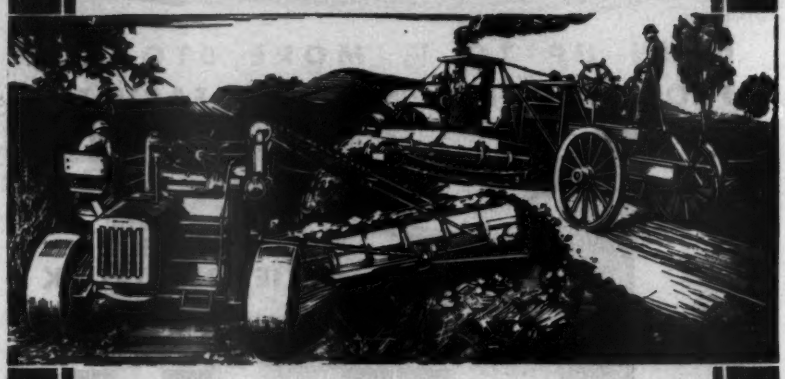
ELECTRIC INDUSTRIAL TRUCKS • HYDRAULIC ELEVATING EQUIPMENT

The RAYMOND CORPORATION
Formerly LYON-Raymond Corporation
3252 SpaceMaker St., Greene, N. Y.

Gentlemen: Please send Bulletin 703 on your SpaceMaker Electric Tiering Truck.

Name_____ Title_____
Company_____
Street_____
City_____ State_____

JOHNSON BEARINGS
1901-1951



BETTER Bearings Help Make BETTER Roads

With the increase in power, capacity and speed in construction machinery came the demand for special types of bearings. Over the years Johnson engineers have designed new styles of sleeve bearings and developed bearings of new materials for this equipment. This is another example of "fifty years of progress in sleeve bearings" at the Johnson Bearing plant.

SLEEVE BEARING HEADQUARTERS *Since* 1901

Johnson Bronze

512 SOUTH MILL STREET · NEW CASTLE, PA.

PRACTICAL LABOR RELATIONS

Begins on page 216

Wage-Hour Minimums for Combination Rates

Combination-rate workers present a Wage-Hour minimum wage problem. Suppose one of your employees works part of the week on a piece-work basis carrying an hourly guarantee of over 75 cents. The rest of the week he's on work paid for at straight-time piece rates. On this work, he gets *less* than 75 cents an hour. But the two rates average out at more than 75 cents for the whole week. Is this legal?

No, says the Wage-Hour administrator. The earnings at each rate must average at least 75 cents an hour.

Right to Lockout by Association Member Decided Again

It will be some time before final settlement of the question of the extent to which a member of an employer bargaining association can retaliate for a strike against a fellow member.

A U. S. Court of Appeals at Chicago said it was OK for an association member to *layoff, suspend,* or *lockout* its employees—when another member of the association was struck. However, the association member must not have a contract currently in effect at the time.

But the Appeals Court further decided that the association member couldn't retaliate by *discharging* its employees.

The NLRB decided in another case that the employer couldn't even layoff, suspend, or lockout. This case is likely to come up before another Court of Appeals. It looks as if the question won't be settled finally until the Supreme Court acts—that is, if the question comes before it. (*Morand case*)

Turn the page

"Tycol Acylkup runs bearings cooler... slashes repair costs... steps up production"

A fact! Tycol Acylkup Grease is an expertly blended calcium soap and specially selected cylinder oil stock combination that assures long bearing life . . . less down time loss . . . lower maintenance costs . . . lower output cost per pound of grease. It is available in a number of penetration ranges to permit application indoors or out— under all weather conditions.

Ask your nearest Tide Water Associated office for complete information. Call today.

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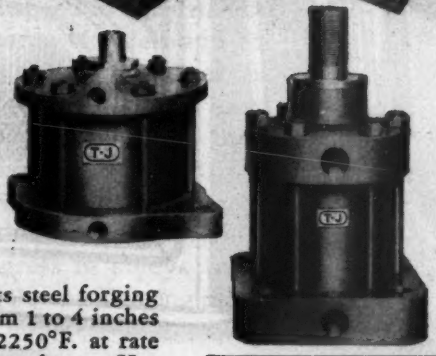
17 BATTERY PLACE - NEW YORK 4, N.Y.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"

Job File No. 3259

Feeds Automatically WITH T-J CYLINDERS

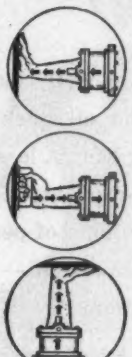


T-J Hydraulic Cylinders furnish efficient, automatic "push power" for feeding devices in this new Ajax-Northrup induction forge heating equipment.

This unit—manufactured by Ajax Electrothermic Corp., Trenton, N. J.—automatically heats steel forging stock in sizes ranging from 1 to 4 inches (rounds or squares) at 2250°F. at rate of 7500 to 8500 lbs. per hour. Has space for 8 heating stations . . . each with *hydraulically operated billet feeding devices employing T-J Cylinders.* These cylinders also eject heated bars automatically. Induction heating with this equipment results in uniformity of successive billets fed to the forge—thus controlling quality of finished forgings and reducing rejects.

Do you have a tough job in power movement—pushing, pulling or lifting? Let T-J help you *simplify machines, save labor* and *cut costs* by using T-J Air or Hydraulic Cylinders! Many standard sizes and styles . . . cushioned or non-cushioned . . . 100 lb. or 50,000 lb. Precision-built, long life. Write for more information. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION



100 LBS. or 50,000 LBS.

35 YEARS EXPERIENCE

TOMKINS-JOHNSON

RIVETORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

T-J

PRACTICAL LABOR RELATIONS

Begins on page 216

BRIEF—BUT IMPORTANT

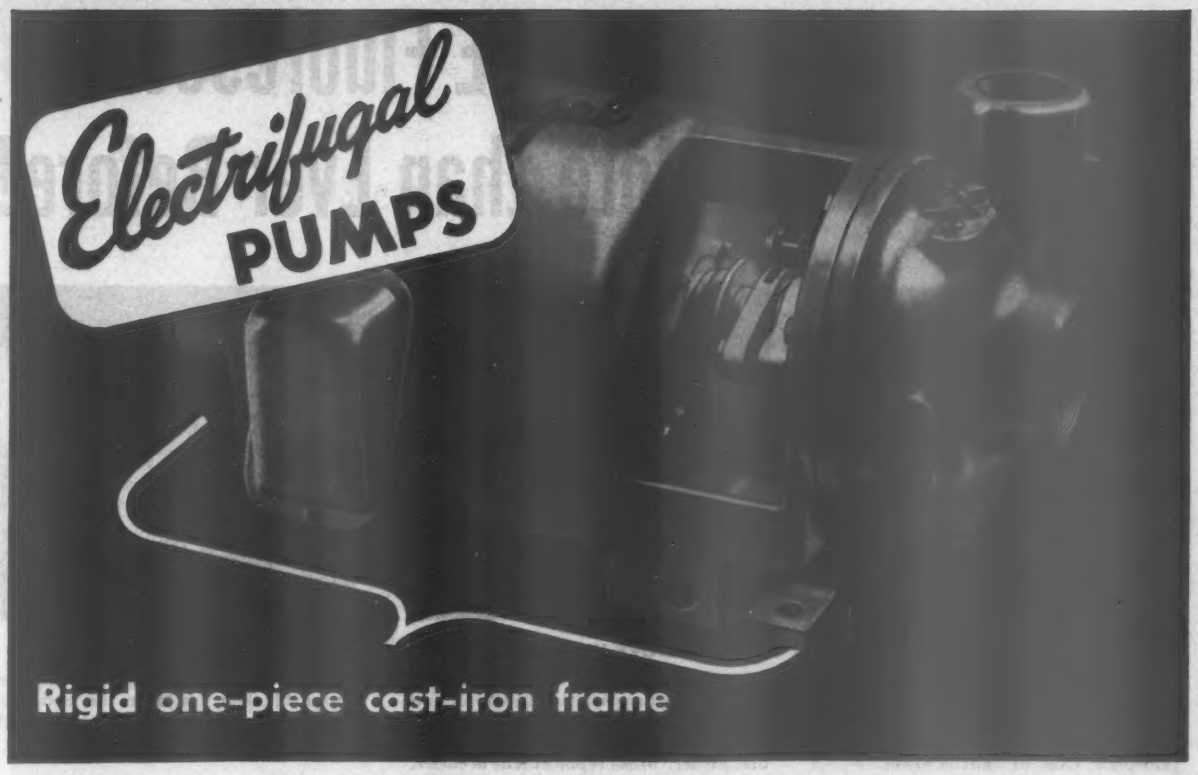
The child labor provisions of the Walsh-Healey Act take a heavy toll of employers. Employers get into trouble when they confuse this law with the Wage and Hour law. There's a difference. Under Walsh-Healey, you cannot hire girls under 18, boys under 16. Under the Wage-Hour law, minors 16 years old or over can be hired.

Grievance must be in writing or it isn't any good, says one arbitrator. Under a contract clause that required a grievance to be filed within a specified time, grievance must be submitted *in writing.* Oral submission is not enough. (*Jones and Laughlin award*)

In an overtime suit, a "working foreman" can inspect his time records kept by company and compare them with other employees he supervised, says a New York court. He said he was always present when the other employees worked. Their time is an indication of his own hours.

There's a limit to what a worker must put up with. The New Haven Connecticut Superior Court awarded unemployment insurance to a worker who voluntarily quit because his boss nagged him constantly for four or five months. No sensible person, thought the court, leaves a $135 a week job just because he is mad at his boss. The nagging must have been rough, it reasoned.

Severance pay for long service employees is OK, as far as the Wage Stabilization Board is concerned with this. *If* it is treated by the company as a gift for income tax purposes; that is, not treated as a deductible business expense.



This is the difference between close-coupled pumps

THIS EXCLUSIVE FRAME DESIGN combines maximum space for packing maintenance with exceptional rigidity in a way that no pump assembled to a standard motor can do. Solid cast iron frame with no joints from motor end housing to pump casing assures permanent alignment.

Bearings are lubricated at the factory and should require no attention for years. The stuffing box carries plenty of packing and all parts are generously proportioned for heavy duty service. Wearing rings and shaft sleeves protect casing and shaft from wear and are easily replaced at low cost when worn. As a result, you will find exceptional freedom from high maintenance costs.

Unit Responsibility Means Dependability

Motor and pump are designed for each other and made in the same plant. You have one responsible source for both... one guarantee of satisfaction. Every Allis-Chalmers pump representative is a competent application engineer who will help you select exactly the right pump for your needs. And 94 Allis-Chalmers Certified Service Shops provide nation-wide factory approved service.

Talk over your pump selection problems with your Allis-Chalmers Authorized Dealer or Sales Representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 52B6140.

A-3337

Electrifugal, Texrope and Vari-Pitch are Allis-Chalmers trademarks.

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Sold . . .
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MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

5 Big Advances in G-E Fluorescent Lamps Give You More than Ever Before!

1. MORE LIGHT

Photometer test shows G-E fluorescent lamps give more light per watt—both when new and throughout life—than ever before, due to a radically improved phosphor. Cost of light is lower.

2. MORE UNIFORMITY

New materials and manufacturing methods reduce variation in lamps. You save money because lamps don't burn out too soon or *outlast* their efficient life, either. Mass replacement is easier.

3. LESS END BLACKENING

You get more light than ever because lamps blacken less near the ends, as a result of using purer materials and more accurate controls.

4. LONGER LIFE

Due to improved equipment and processes, G-E fluorescent lamps now last longer than ever before. Accurate tests on life-racks like this prove it. You don't have to replace lamps so often.

5. SHOWS COLORS BETTER

A new phosphor coating makes possible Deluxe Cool White and Warm White fluorescent lamps that show colors as they really are. Use wherever best color rendition is important.

FREE BOOKLET

New guide to better lighting for better production, "Planned Lighting for Industry." Write to General Electric, Department 166- F-10, Nela Park, Cleveland 12, Ohio.

SEE BETTER—WORK BETTER! Modern fluorescent lighting gives a broader, more even spread of light, reduces shadows and glare. In factories, it helps workers see better to work better. Output is increased. Rejects are reduced. Accident rates are cut. Morale is improved.

To get the *most* from fluorescent lighting, use General Electric "5-ways-better" fluorescent lamps, the result of continuous lamp research. Newest form of fluorescent is G-E slimline—world's most modern light source. For new lighting or replacements, call your G-E lamp supplier.

You can put your confidence in—

GENERAL ELECTRIC

These busy builders don't waste a minute

...reminds you of U.S.G. roof deck contractors who build

SHEETROCK-PYROFILL

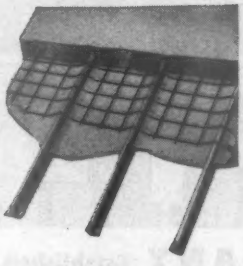
T. M. Reg. U. S. Pat. Off.

poured-in-place gypsum roof decks

Bees build their hives to "required specifications" and always meet the construction schedule. That's their specialty.

U.S.G. roof deck contractors build SHEETROCK-PYROFILL roof decks to required specifications, too—and building fast is *their* specialty. That's because SHEETROCK-PYROFILL goes on at the rate of 20,000 square feet and more per day, after steel is in place. And it sets in less than 30 minutes! SHEETROCK-PYROFILL is incombustible, lightweight, strong, easy to maintain.

But remember: *only your U.S.G. roof deck contractor can build* SHEETROCK-PYROFILL *roof decks.* He also erects roof decks of USG Precast Metal Edge Gypsum Plank and Short Span Gypsum Tile. For his name, write Industrial Sales Division, United States Gypsum, Chicago 6.



Note how SHEETROCK-PYROFILL anchors itself to the steel sub-purlins.

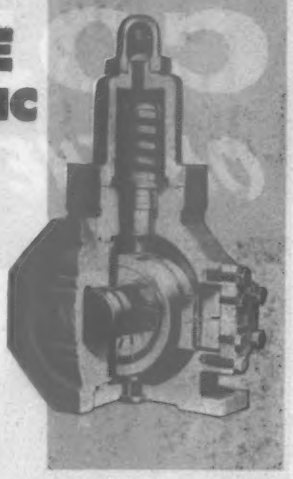
United States Gypsum

For Building • For Industry

Gypsum • Lime • Steel • Insulation • Roofing • Paint

RACINE HYDRAULIC PUMPS

Simplify your Circuit



Less valves and controls in a circuit provide easier installation and lower initial costs.

RACINE "Variable Volume" Pumps eliminate relief valves and extra piping. They reduce horsepower requirements and avoid excessive heat losses. Over-all cost of motor and reservoir is usually reduced. Efficiency is high because RACINE Pumps "put all of the oil to work."

A wide range of governor controls provide pumping action at the proper pressure and volume to handle any given job most effectively. These interchangeable governors are an exclusive RACINE feature.

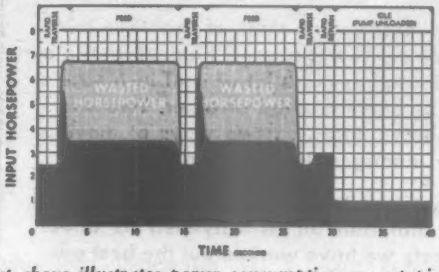


Chart above illustrates power consumption on a typical machine tool. Black area is power used with a No. 2 RACINE "Variable Volume" pump controlled by a pressure compensated feed value. Area in color is power wasted by a constant volume pump, bypassing most of its volume through a relief valve during the feeding cycle.

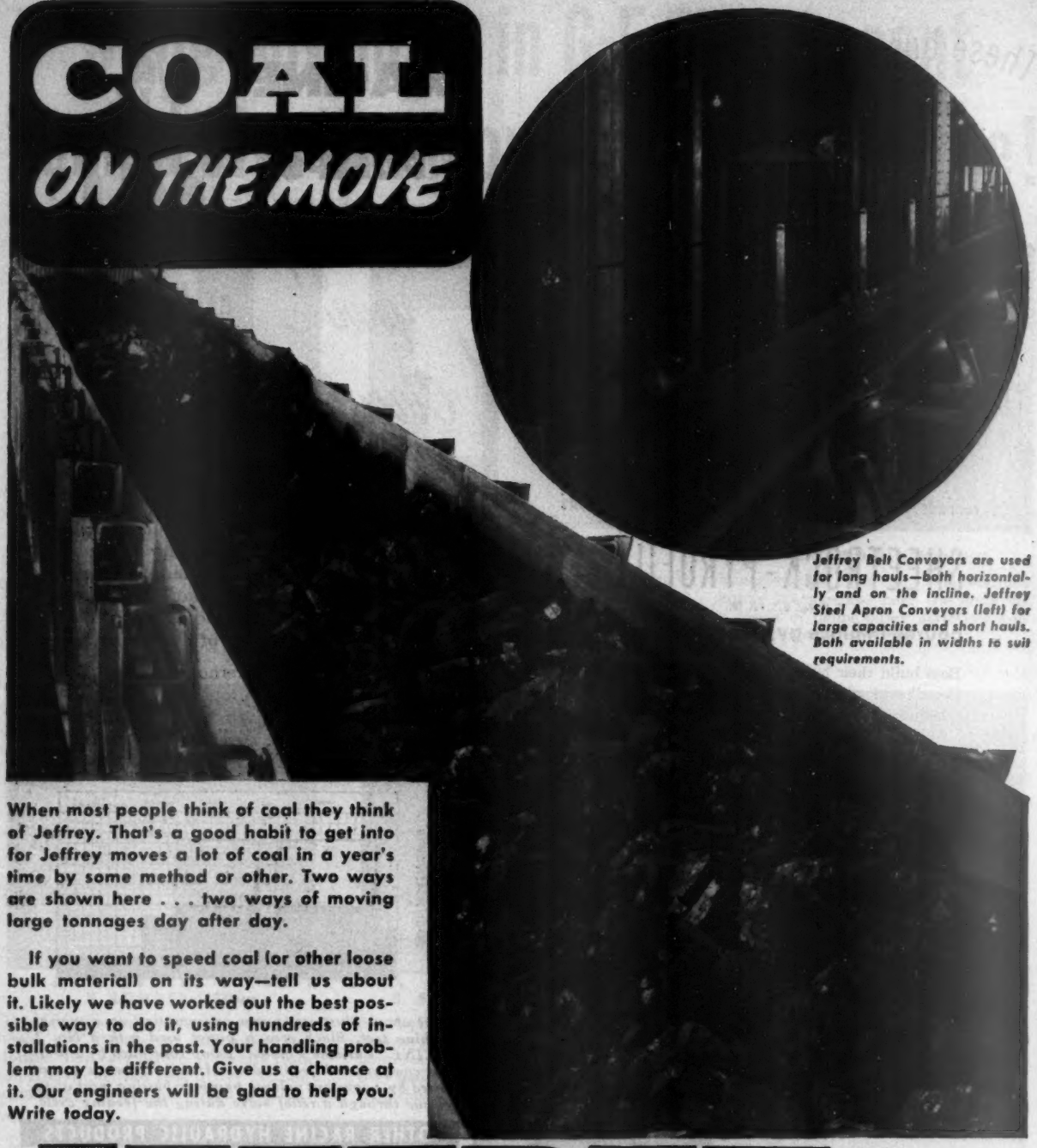
OTHER RACINE HYDRAULIC PRODUCTS

Write for new 3-color Catalog P-10-D covering RACINE's complete line of "Variable Volume" Pumps, Valves and Pressure Boosters.

RACINE TOOL AND MACHINE CO.

1777 State Street, RACINE, WISCONSIN, U. S. A.

COAL ON THE MOVE



Jeffrey Belt Conveyors are used for long hauls—both horizontally and on the incline. Jeffrey Steel Apron Conveyors (left) for large capacities and short hauls. Both available in widths to suit requirements.

When most people think of coal they think of Jeffrey. That's a good habit to get into for Jeffrey moves a lot of coal in a year's time by some method or other. Two ways are shown here . . . two ways of moving large tonnages day after day.

If you want to speed coal (or other loose bulk material) on its way—tell us about it. Likely we have worked out the best possible way to do it, using hundreds of installations in the past. Your handling problem may be different. Give us a chance at it. Our engineers will be glad to help you. Write today.

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Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 2 · Beckley, W. Va. · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 15 · Denver 2 · Detroit 13 · Forty Fort, Pa. · Harlan, Ky. · Houston 2 · Jacksonville 2 · Milwaukee 2 · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 1 · Salt Lake City 1

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Quartz.....Formica....Copper Tubing?

INGENIOUS Delta SET-UPS CUT THEM ALL

Faced with problems of machining out-of-the ordinary materials, many shop superintendents and tool engineers have found the solution by adapting low-cost, high-precision Delta wood and metal working machines. Here are typical examples:

Cutting Quartz

National Scientific Products Co., Chicago, built a special mounting for Delta 14-inch drill presses, and fitted them with abrasive wheels, to cut wafer-thin quartz crystals for communication instruments. Side-mounted, pivoted drill press heads are actuated by a hydraulic-cylinder power feed. Curtain prevents lubricant splashing.

Cutting Formica

Boothcraft, Inc., Jamestown, N. Y., cuts Formica for restaurant counter and table tops on Delta Unisaws. Boothcraft also uses Delta disc sanders for finishing the edges of sheets of Formica, which has a hardness approaching steel.

Cutting Copper Tubing

LeRoi Co., Milwaukee, fitted an adjustable reel to a Delta cut-off machine to cut copper tubing to length. Reel cuts handling time and labor costs, and permits under-bench storage of a variety of sizes.

There's a Delta Power Tool for Your Job-

WOOD OR METAL WORKING

53 MACHINES — 246 MODELS — MORE THAN 1300 ACCESSORIES

For Delta dealers, see your Classified Phone Directory under "Tools"

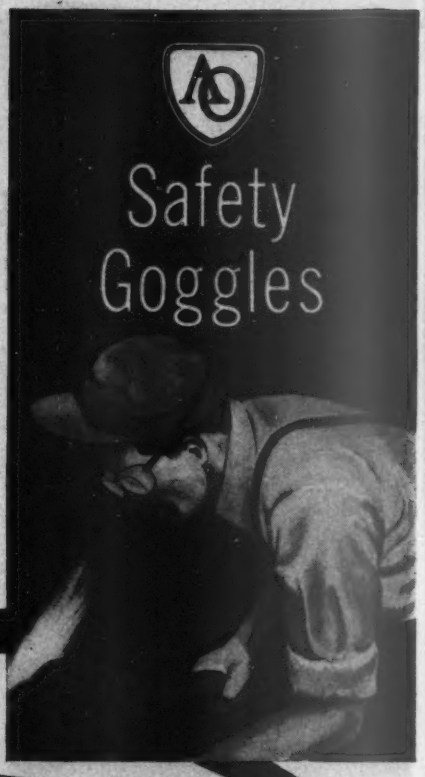
DELTA POWER TOOL DIVISION

Rockwell

MANUFACTURING COMPANY

6191 E. VIENNA AVENUE • MILWAUKEE 1, WISCONSIN

Both "PANORAMS" give BIG VALUE for Your EYE PROTECTION MONEY!



The model numbers and sizes differ (AO 600 for medium and larger faces—AO 800 for smaller faces) but you'll find the same superb wide angle vision, lightweight comfort and conformance to high safety and optical standards in both of these plastic goggles. Worn directly over the eyes or over personal glasses, they protect against flying particles from any direction. For chipping, grinding, babbitting, cutting rivets or rails, riveting, spike driving, spot welding. Your nearest AO Safety Products Representative can supply you.

QUICK FACTS

- Plastic frame and lenses. Cups conform closely to facial contours.
- Smooth face-contacting edges for maximum comfort.
- Many perforations of frame for ample ventilation and reduction of fogging possibility.
- Bridge is floating saddle type for comfortable fit without pressure.
- Lenses are shatter-resistant acetate. Note swivel rod in center for easy replacement. Clear or green. Green lenses absorb practically all ultraviolet radiations, reduce excessive glare.

American Optical
SAFETY PRODUCTS DIVISION

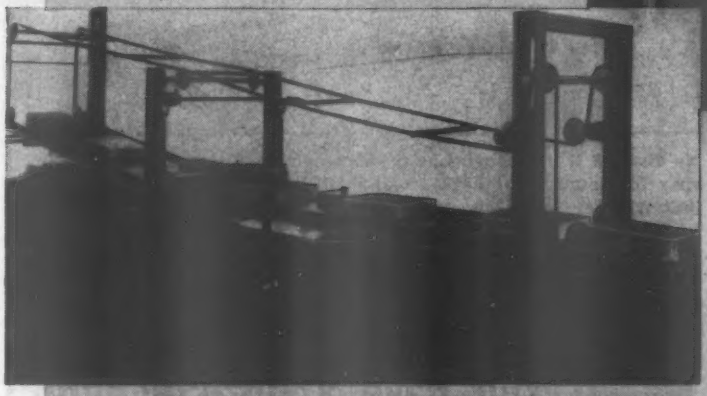
SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

SIMPLE AS A-B-C

Automatic Top and Bottom Case Sealer made by A-B-C Packaging Machine Corp., Quincy, Ill. Main drive Diamond No. 434, No. 66 on sealing operation and 1½"P extended pitch chain for conveying the cartons through gluer section.

Diamond No. 434 roller chain for main drive and No. 66 with cross flight attachments for conveying on A-B-C Case Unloader and Unscrambler.

A-B-C Semi-Automatic Top and Bottom Case Sealer with Diamond No. 434 on main drive, No. 66 on closing mechanism and 2"P roller conveyor chain for conveying cartons through gluer section.



DIAMOND ROLLER CHAINS Simplify Operation

● For the packaging of products of all kinds for civilian or military use, modern automatic machinery is necessary because it multiplies the speed and requires a minimum of manual labor.

Driven by dependable Diamond Roller Chains, the A-B-C Case Sealers and Unloaders operate at high speed and low cost. Efficient steady operation is assured with minimum labor or attention.

Whatever the particular requirement, short or long centers, fast or slow speeds, unusual strain or shock—wherever transfer of power or material without waste or slip is important—DIAMOND ROLLER CHAINS perform with time and cost saving advantages.

DIAMOND CHAIN COMPANY, Inc.

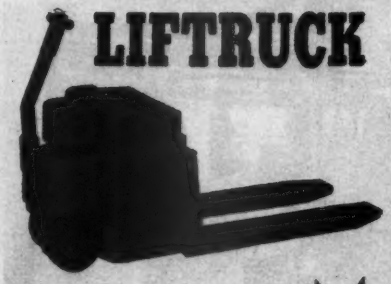
Dept. 449, 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER.

Gives ONE MAN the strength of FIVE!

GO-GETTER
Pallet Type POWER LIFTRUCK



This walk-along electric truck is compact, powerful . . . gives one man the strength of five. Go-Getter lifts full four inches in only four seconds, drops loads gently and quietly. It rides smoothly on uneven surfaces. Braking is safe and easy. This power-operated dual drive wheel liftruck is strong, maneuverable, stable . . . has 200° turning arc and low center of gravity. Comes in 2-ton and 3-ton models. Send coupon today for Bulletin.

BULLETIN

REVOLVATOR CO.
DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT SINCE 1904

8761 TONNELE AVENUE, NORTH BERGEN, N. J.

Without obligation, please send bulletin on Go-Getter Pallet Type Power Liftrucks.

Name _____

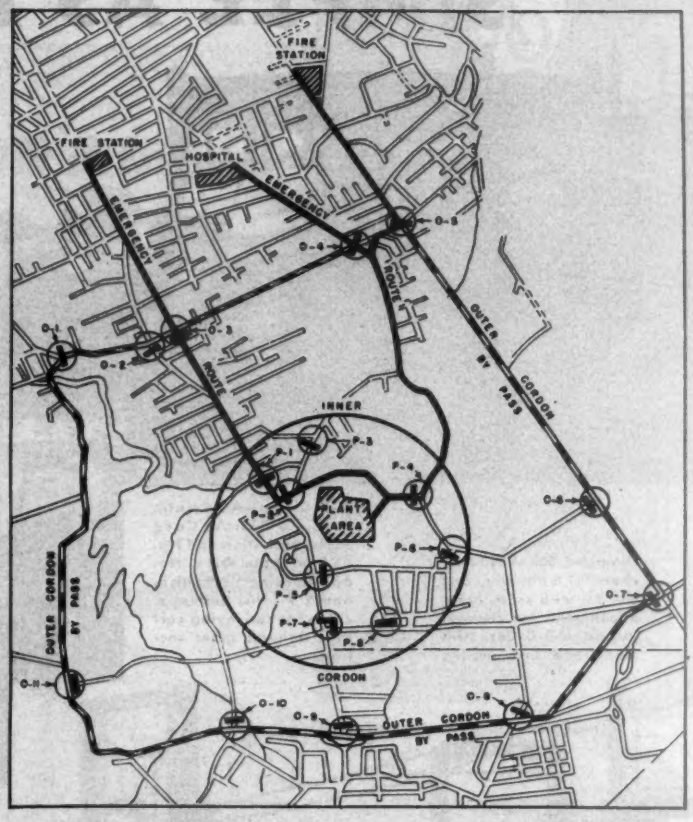
Position _____

Company _____

Address _____

_____

RE-101



No disaster traffic control plan will work for all plants. Conditions vary too much. But here's a plan, developed by Liberty Mutual, that will tell you . . .

. . . How You Can Control Traffic If You Have a Disaster

By CHARLES A. GOODWIN
Director, Traffic Safety Bureau
Liberty Mutual Insurance Company, Boston

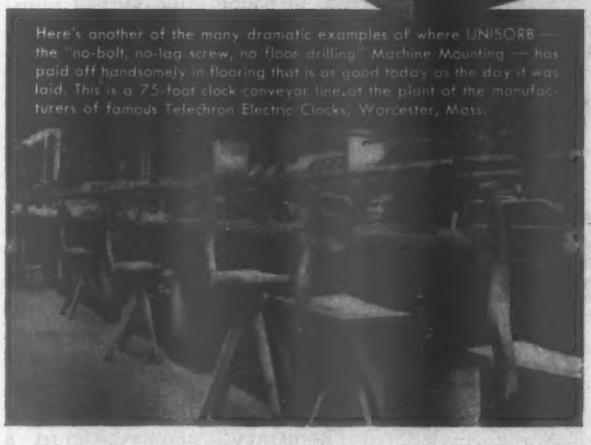
HAVE YOU STOPPED to consider the problems you will face in case of a disaster in your plant? Have you a definite plan all worked out to meet those problems?

Many companies know exactly what they'll do *within the plant* in case of disaster. But all too often, these plans overlook the important problem of controlling traffic on the roads leading to the plant.

It makes no difference what causes the disaster—fire, explosion, sabotage, even bombing. You can count on the fact that right after the disaster occurs, roads to the plant will be jammed. And that just adds to the disaster. It blocks off the emergency apparatus you need—fire engines, ambulances, doctors, and police.

The problem of keeping roads clear is not limited to the curious who flock to any disaster.

You will also need a coordinated plan for diverting regular traffic—especially trucks—from roads that must be used for emergency vehicles. And if the disaster occurs while the shift is changing, you'll have to provide



Here's another of the many dramatic examples of where UNISORB — the "no-bolt, no-lag screw, no floor drilling" Machine Mounting — has paid off handsomely in flooring that is as good today as the day it was laid. This is a 75-foot clock conveyor line at the plant of the manufacturers of famous Telechron Electric Clocks, Worcester, Mass.

Do Away with DESTRUCTIVE Floor Drilling

Mount ALL Your Machines and Conveyor Lines on UNISORB®

No bolts... no lag screws... and no more old-fashioned, costly floor drilling. That's what you get when you switch to the modern machine-mounting... UNISORB.

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In addition to these important savings, you'll do well to remember that UNISORB eliminates 60-85% of all transmitted machine vibration and noise. This means longer life for machines, for floors, for buildings... and a substantial lowering of the noise factor for improved working conditions and morale.

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"All the boys ask for Simonds wheels" says the stock clerk. Why? Because they get top production and fewer rejects with Simonds Abrasive Company wheels. They're proven producers — accurately specified on every job . . . a real investment in greater grinding efficiency. Let a Simonds engineer help find out where they fit into your plant operations. It costs nothing. Write.

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Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

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WHERE WERE YOU JAN. 14-17, 1952?

BE SURE YOU'RE ABLE TO SAY...

AT THE THIRD
PLANT MAINTENANCE SHOW & CONFERENCE
IN PHILADELPHIA

REMEMBER... this is the show for presidents, vice presidents, general managers, plant managers, plant engineers, maintenance engineers — and all other plant operating men whose responsibility it is to select, install, operate, and maintain the plant equipment and services that mean low-cost operation and high production.

SO... circle Jan. 14-17 today on your 1952 calendar ... write right now for rooms at your favorite Philadelphia hotel (for yourself and key people in your organization)... and mail this coupon →

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Please send ____ tickets for the Plant Maintenance Show.

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FREE

TRAFFIC CONTROL...

Begins on page 232

for getting employees' cars off the road.

There's no single plan for emergency traffic control that will fit every plant. Local conditions vary too widely. Developing a plan that takes local conditions into consideration is the key to a successful plan.

However, there are certain principles that can be applied in almost any situation. They can be illustrated through the basic plan developed by Liberty Mutual in cooperation with a number of its policy holders. We call it "Traffic Interceptor Control Plan."

INITIAL PLANNING · It sounds trite, but the first thing you've got to do is define your problem in terms of local conditions.

Start out with a standard city map (scale: between 400 and 800 feet to the inch). If you don't have one, you can probably get one at the office of the city engineer or city planner. Try the county surveyor's office if your plant is in a unincorporated area.

Remember, you want just a simple map. You don't need terrain features, contours, building details.

Mark the location of your plant. Then mark off the locations of the firehouses where equipment would come from if disaster hit your plant. Not just the firehouse nearest you, but all firehouses around. A real disaster would bring equipment from many firehouses. Also plot hospitals, ambulance stations, Red Cross first aid stations, police stations.

Next, show on the map the routes that equipment from any of these emergency stations would take to get to your plant. This *may not* always be the shortest route. It *should* be the best and fastest route. Make sure police, fire, and highway officials concur before you plot these routes. The rest of your plan depends on them.

When you have plotted these

WIRE ROPE

ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices . . . have the full strength of the rope. Send for the full story.

Roebling "Blue Center" Preformed works better . . . lasts longer . . . cuts costs

"BLUE CENTER" STEEL wire rope is an exclusive Roebling development. Its high resistance to abrasion, shock and fatigue spells long life. In addition, Roebling Preforming gives you a rope that is easy to handle . . . has better spooling qualities . . . reduces vibration and whipping. This combination makes Preformed "Blue Center" Steel Wire Rope a top performer on the job.

Roebling makes a complete line of wire rope . . . there's a construction for every installation. Have your Roebling Field Man help choose the *right* rope for your equipment. Get his advice on the correct use and maintenance of wire rope. It is based on performance records on thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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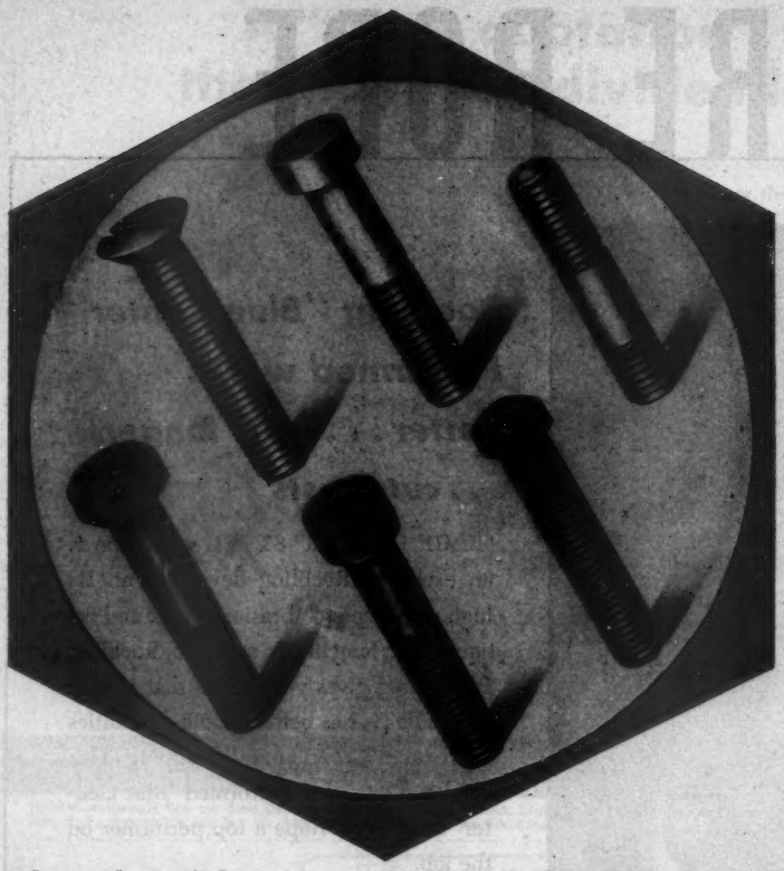
Atlanta, 934 Avon Ave ★ *Boston*, 51 Sleeper St ★ *Chicago*, 5525 W. Roosevelt Rd ★ *Cincinnati*, 3253 Fredonia Ave ★ *Cleveland*, 701 St. Clair Ave, N.E. ★ *Denver*, 4801 Jackson St ★ *Detroit*, 915 Fisher Building ★ *Houston*, 6216 Navigation Blvd ★ *Los Angeles*, 216 S. Alameda St ★ *New York*, 19 Rector St ★ *Odessa, Texas*, 1920 E. 2nd St ★ *Philadelphia*, 230 Vine St ★ *San Francisco*, 1740 17th St ★ *Seattle*, 900 1st Ave, S. ★ *Tulsa*, 321 N. Cheyenne St ★ Export Sales Office, *Trenton, N. J.*



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Cap Screws • Set Screws • Milled Studs

Specialization at "Cleveland Cap" guarantees closer attention to accurate production, rigid inspection, and prompt shipment (as conditions permit). Our capacity is concentrated on standard Cap Screws in an unusually wide range of sizes—all popular heads; square head Set Screws, and Milled Studs. We also have capacity for producing your special design headed and threaded parts by cold extrusion. See your jobber for *standard* items; write us about your "specials."

THE CLEVELAND CAP SCREW COMPANY
2917 East 79th Street, Cleveland 4, Ohio
Warehouses: Chicago • Philadelphia • New York • Providence

CLEVELAND *Top Quality* FASTENERS

originators of the Knurman Process
Ask your jobber for Cleveland Fasteners

TRAFFIC CONTROL...

Begins on page 232

you will have defined your most important problem: How to keep these emergency routes open for emergency traffic.

PREPARING THE PLAN • To keep emergency routes clear, and to keep all unnecessary traffic out of the immediate plant area, you'll need by-pass routes for other traffic. Since you'll want at least one route completely around the plant free for emergency vehicles, the by-pass route should be at least the *second tier* away from the plant. (On the sample map, page 232, the by-pass route is marked "outer cordon by-pass" and is shown as a broken black-and-white line.)

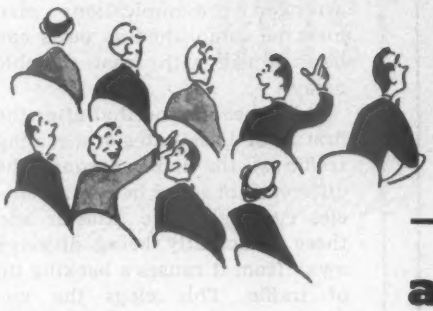
Primary purpose of the by-pass route is to keep non-emergency traffic moving *around* the disaster area. A jam on a road leading to the disaster can be just as serious as one within the disaster area.

To force non-essential vehicles to use the by-pass route and keep out of the plant area, interceptor posts are set up at all intersections leading into the plant area. There are two rings of interceptor posts. Personnel at the posts have two primary purposes:

1. Don't let vehicles stop. Stopped cars are accident hazards, especially when roads are heavily traveled. They also slow the flow of traffic.

2. Don't permit U-turns. U-turns can jam traffic faster than anything else. That's a prime reason why the by-pass route should completely circle the plant area. In-bound traffic can be turned off on the by-pass and then moved out again without making a U-turn.

Inner Cordon • Interceptor posts in the inner cordon are of primary importance and should be selected carefully. They are manned by plant employees. They must go into action immediately after a disaster in order to clear away from the plant all non-



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of Tool and Die Making —you Buy Less Steel and Reduce Machining Costs

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FCC Cast-To-Shape, the modern method of tool and die making, is effecting important savings of time, trouble and money for an increasing number of manufacturers.

Even very intricate shapes can now be cast successfully within an eighth inch of finished size. This means that you buy less steel at the start and reduce machining costs substantially.

Tools which could not be made by conventional methods except in sections can often be fabricated from FCC Cast-To-Shape blanks in a single piece.

In many instances performance of the tool is better than can be obtained by fabrication from bar stock or forgings.

Particulars are available through Allegheny Ludlum representatives; or write for the booklet today.

● Allegheny Ludlum Steel Corporation, Forging and Casting Division, Wanda and Jarvis Avenues, Detroit 20, Michigan.

For complete **MODERN** Tooling, call

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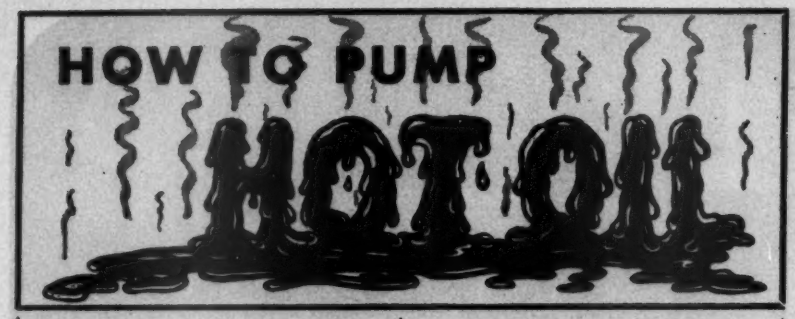
WAD 3668

AL FINE TOOL STEELS SINCE 1854



Pumping hot oil for industrial processes or in refinery applications is a specialty of KINNEY HELIQUAD HQ ROTARY PUMPS. Efficiency and durability — all important in this type of work — are the big recommendations for Kinney HQ Pumps. One Kinney HQ 8 x 4 Pump has been in hot oil service for over 12 years, delivering 190 g.p.m. and supplying 1,600,000 B.T.U. per hour . . . and it's still performing at full rated capacity! This is a typical case history for Kinney Pumps.

For most hot oil pumping jobs, we recommend cast steel HQ Pumps due to the shock temperature conditions encountered. We offer a wide range of jacketed pumps, several sizes of which are listed in the table. Besides the operating temperature, our engineers will need to know the gravity and viscosity of the oil in order to recommend the right pump for your particular job. Be sure to specify whether the service is continuous or intermittent, and also what the suction and discharge pressures will be.

PUMP SIZE	HQA 6373	HQA 64573	HQA 8493
Pumping Temp. °F.	600	600	600
Absolute Viscosity in Poises	.005	.005	.005
Capacity GPM	90	140	180
Speed RPM	520	520	420
Differential Pressure	50	50	50

Other sizes are available.

General Aniline Works Division of General Aniline & Film Corporation at Rensselaer, N. Y., employs this circulating oil heating system to process dye intermediates. The system depends on a Kinney Heliquad Pump to deliver oil at temperatures up to 300°F and pressures up to 100 psi to an oil-jacketed kettle. The complete installation is explosion-proof for safe handling of flammable solvents.

Whatever your hot oil pumping problem, it will pay you to consult Kinney. Send coupon for new Liquid Pump Bulletin, KINNEY MANUFACTURING COMPANY, Boston 30, Mass. Representatives in New York, Chicago, Cleveland, Houston, New Orleans, Philadelphia, Los Angeles, San Francisco, Seattle, and foreign countries.

Kinney LIQUID PUMPS

KINNEY MFG. COMPANY
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Gentlemen: Please send me new Bulletin L51.
My liquid pumping problem involves:

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☐ Lube, Diesel Oil, etc. ☐ Distillate ☐ Edible Oils ☐ Fuel Oils
☐ Road Oil ☐ Molasses ☐ Hot Oil ☐ Gasoline
☐ Solvents ☐ Water ☐ Others (see letter attached)

Name _____ Company _____

Address _____

TRAFFIC CONTROL...

Begins on page 232

essential traffic that happens to be around when the disaster occurs.

In the sample plan (see map) there are eight such inner cordon interceptor posts.

Make sure you have interceptor guards for each shift the plant works. Where possible, select alternate guards to take care of absentees. It's a good idea to have two men at the interceptor posts where traffic is likely to be heaviest. Select men from plant areas adjacent to the posts. It will speed manning them.

Outer Cordon • The outer interceptor posts are designed to keep important access roads open between the inner and outer cordon. These posts are manned by city, county, or state police, depending on jurisdiction. A prearranged communications plan must be established so posts can be manned with least possible delay.

It has been found that after the first 10 or 15 minutes of directing traffic at the inner cordon, the difference in speed between vehicles rushing to the disaster and those reluctantly being diverted away from it causes a backing up of traffic. This clogs the approaches, unless the load is taken off further back. The outer cordon does this.

In addition to the civil police force manning the outer cordon posts, mobile patrols will be needed to cover outer cordon roadways.

Employees Entering • If the disaster occurs when employees are on their way to work, the shift should not be permitted to enter the inner cordon until the emergency is over. Their cars would impede the arrival of emergency equipment. Employees' vehicles, just like other nonessential traffic, should be shunted away from the plant area.

It's a good idea to designate an assembly area outside the inner cordon to which all employee vehicles should go. They should

introducing

the Coffing COIL CHAIN SAFETY-PULL RATCHET LEVER HOIST

Here is a completely new ratchet lever hoist designed to bring you added safety and convenience. The Model R incorporates the time-proved ratchet and pawl principle originated by Coffing — makes it hold positively at all times — no friction-type brake to slip or freeze — chain is free wheeling when not under load.

Advanced Guard for a New, Advanced Line

The Model R is now available in 1,500- and 3,000-lb. capacities — other sizes will follow.

Many New Advantages

COIL CHAIN Swings or wraps in any direction for greater flexibility in use.

SIX OPERATING POSITIONS Handle operates in any position, works on full or partial strokes — for ease of handling in close quarters. Safety stops prevent spinning of handle.

SAFETY FACTOR OF FIVE All hoist load-holding parts designed to withstand pull equal to five times rated capacity. Each hoist also factory tested at 100 percent overload. "Safety-valve" handle bends at point of maximum safe overload.

SIMPLE TO SERVICE The Model R may be completely disassembled with only a screwdriver for easy servicing. Not necessary to return it to the factory for repairs.

Find out more about the hoist that gives you greater convenience and safety in all lifting, pulling, stretching. Write for Bulletin M10R.

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Danville, Illinois

Quik-Lift Electric Hoists • Hoist-Alls • Mighty-Midget Pullers
Spur-Geared Hoists • Differential Chain Hoists • Load Binders
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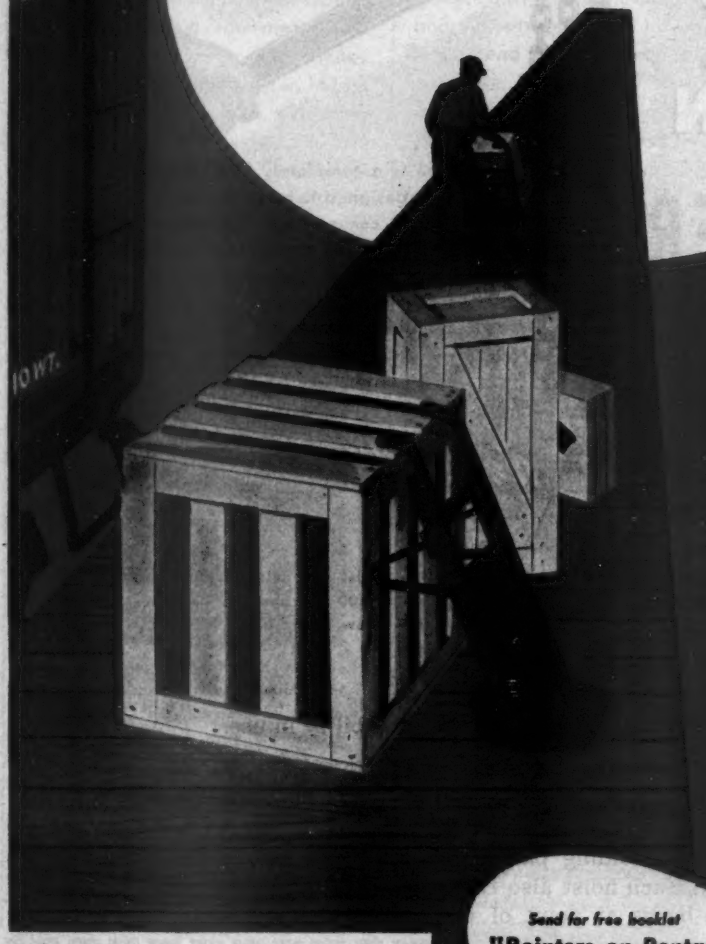
Sold by Industrial Distributors everywhere

Plant managers need to know more about wood!



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BUILD WITH Penta-PROTECTED WOOD

Wood is an extremely important industrial building material . . . for many jobs the best you can use. It's easy to handle, has superior sound-absorbing qualities, and is comparatively cheap. Now you can get still *more* from your wood. Protect it with PENTA, the *clean* wood preservative.

PENTA adds years of life and strength to wood by protecting it against termites and rot. Its deep, penetrating action assures you of wood that lasts up to four times *longer* than untreated wood. You'll find that PENTA leaves wood clean and easy to work with.

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Penta
chlorophenol

TRAFFIC CONTROL . . .

Begins on page 232

wait there until it's safe to enter the plant area.

Employees Leaving • If the disaster occurs right at shift time, cars in the plant parking lot must not be permitted to leave. Employees should leave the area on foot and not return for their cars until they have been told to do so by the plant protection chief.

The assembly point for employees just leaving on a shift should be predetermined.

PRACTICE DRILLS • You must hold practice drills to perfect the plan after it has been developed. Employees must learn the best and quickest means of getting to their assigned posts. They'll need practice handling traffic at the interceptor posts. Have your plant protection chief attempt to drive through the interceptor posts. This will give guards practice and let the plant protection chief test the post guards at the same time.

Leaks in the plan will be noted and corrected before correction is too late.

Check manning of interceptor posts against time standards. To be of real value, the practice sessions must be as real as you can possibly make them.

TO SUM UP • A question may arise as to the propriety of using plant employees for emergency purposes. The Texas City disaster of 1947 was an example of a permanent emergency organization which was made completely inoperative by the emergency for which the plan was established and the employees specially trained.

However, the plant layout and nature of industrial processing at most plants permits the establishment of a plant emergency organization to control traffic. At plants where only one or two regular guards are used, members of the regular work force, properly selected, trained, and deputized, can form a disaster traffic control organization.

Looking for subcontractors for defense contracts?

New York State, through its "Industrial Preparedness Survey," has inventoried the production facilities available within the State. Use this free public service to help you find the subcontractor you need.

New York State is ready to help you locate qualified subcontractors to supply parts or assemblies.

This assistance is based on a recently completed inventory of metalworking, woodworking, paper, textile and plastic facilities.

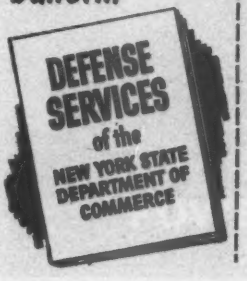
This information, compiled by the N. Y. State Department of Commerce from thousands of questionnaires sent to all known companies in these industries, has been classified, coded and recorded so that the number, kind and capacity of machines can be easily found and identified.

Thus, firms with the required facilities and capacity can be quickly suggested as subcontractors.

Any inquiry from you will be handled exactly as you specify. For example, you may wish to contact a list of firms qualified by their general facilities or special tools to perform the work desired. Or, you may prefer to have us determine the current interest of these firms by outlining to them such details as you may submit to us. If you do not wish to have your identify disclosed, we can forward the result of our circularization to you for direct contact. In every instance, the New York firms suggested will be those which are known to have the required equipment based on an examination of our 1951 "Industrial Preparedness Survey."

Just one of many services—Aid in locating subcontractors is just one of the many services available to both large and small manufacturers. A special bulletin describes in detail the defense services of New York State Department of Commerce. Copies are free.

Write for bulletin



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Room 111, 112 State St., Albany 7, N. Y.
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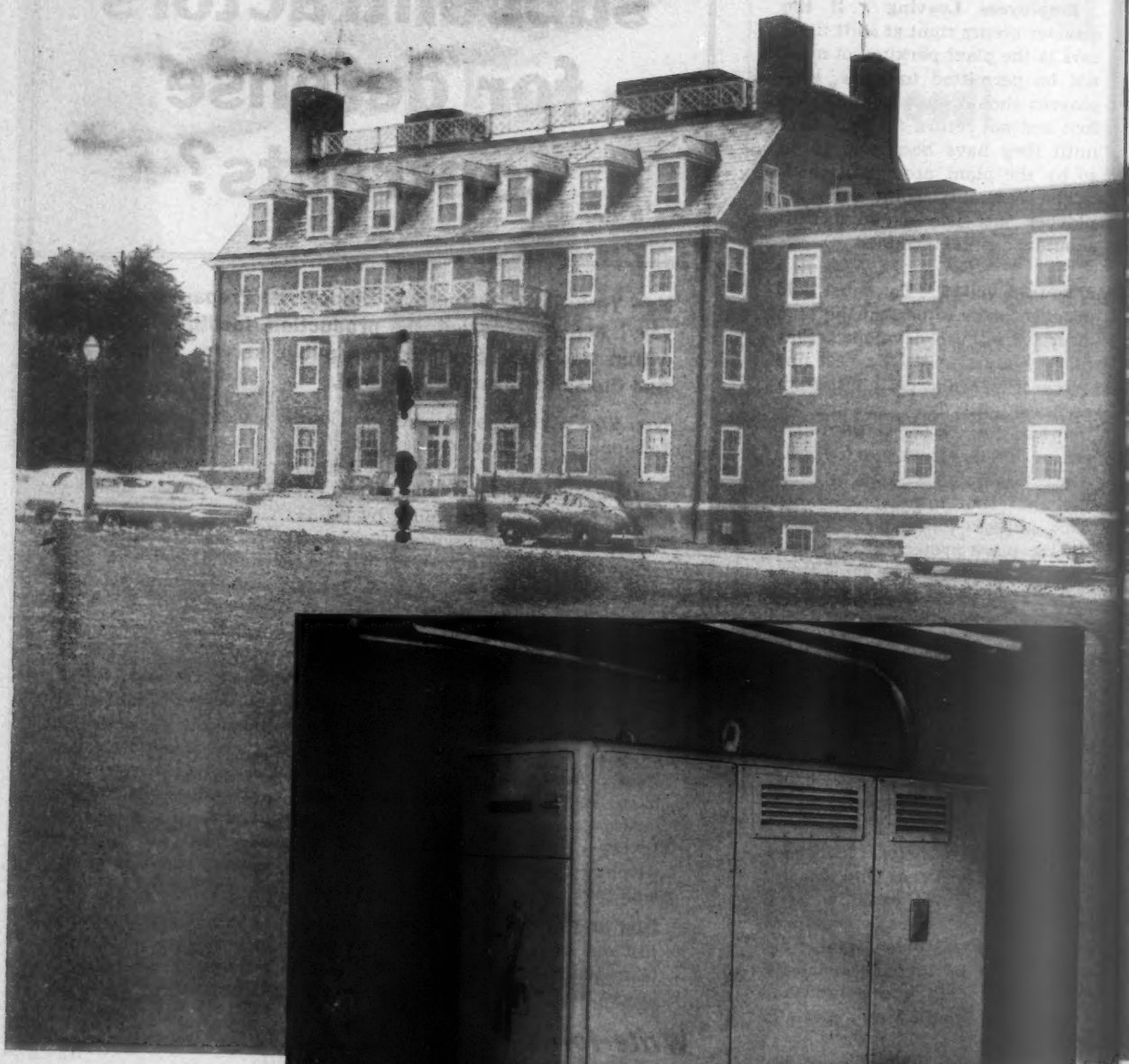

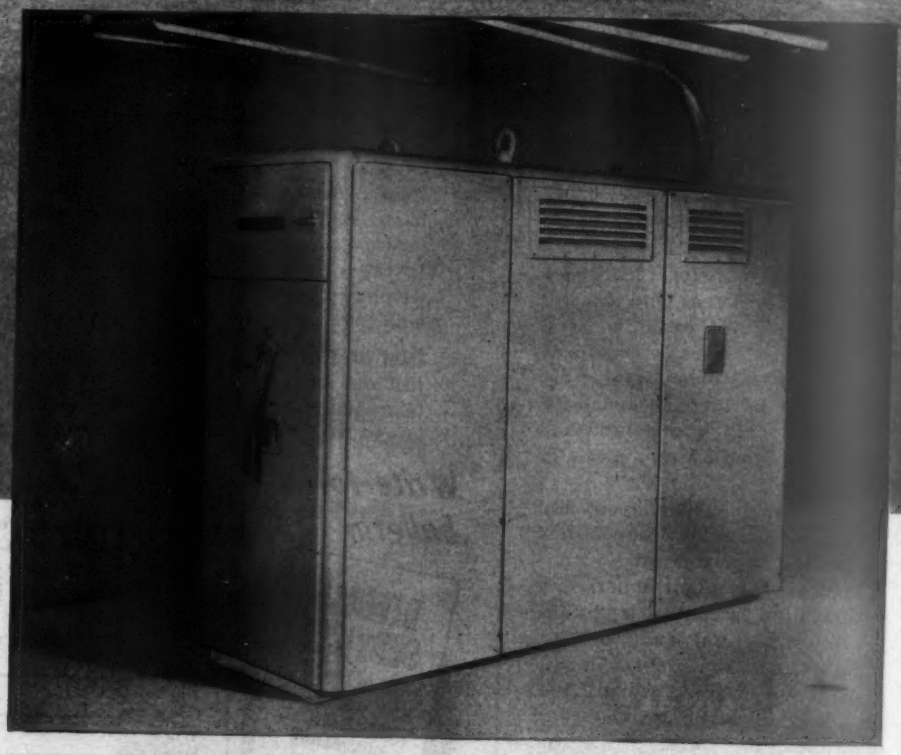

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The Shenango Inn, Sharon, Pennsylvania

Photo at left illustrates the Westinghouse "ASL" Power Center installed in the basement.

For safe and efficient power distribution, Westinghouse "ASL" Dry-Type Power Centers are the answer for industrial and commercial building. The Shenango Inn, for example, installed this most modern electrical equipment.

Here's a power center that is specially designed for efficient control of feeder circuits to supply both power and lighting. Easily installed, it comes as one complete unit with only two connections to make. Simply set the unit in place and connect both high and low-voltage feeders. In addition, you get these proved advantages:

COMPLETELY ENCLOSED FOR SAFETY. Power center is enclosed by sheet steel panels with all live parts covered for maximum protection. No oil or hazardous liquids used . . . no special protective vaults required.

NATURAL DRAFT VENTILATION. No fans or blowers are necessary. Large air ducts are provided for natural draft circulation through housing and coils. Vertical air cylinder insulates low-voltage windings from high-voltage windings.

LIGHT WEIGHT . . . SMALL SIZE. Lighter, smaller Hipersil® cores are standard in all Westinghouse Power Centers. Because no heavy, bulky liquids are used, a heavy tank is not necessary. Approximately ⅓ less floor space required.

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Available in ratings 2,000 kva to 300 kva; high voltage 15,000 volts to 5,000 volts as "ASL". 300 kva and below, 5,000 volts and below as "AVR".

Call your nearest Westinghouse representative for complete information. Or write for Booklet B-4428, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-70613

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Hints for making your products "flexible"

Here are three widely diverse and totally unrelated products. Yet each is made more useful, more versatile with the help of American Flexible Metal Hose or Seamless Tubing.

For piping or ports that move, vibrate or are out of alignment; for carrying almost any liquid, gas or semisolid under high temperatures or pressures, there's a type of American Flexible Metal Hose or Seamless Tubing for the job. You'll be interested in Bulletins SS-50 and CC-300 with technical details and many application histories. Send for them today. The American Brass Company, American Metal Hose Branch, Waterbury 20, Conn. In Canada: The Canadian Fairbanks-Morse Company, Ltd. 21288

LATHE CHUCK

This giant lathe chuck holds railroad car wheels. To exert equal pressure on the wheel rim, five sets of American Seamless Bronze Flexible Tubing carry hydraulic fluid to each of the five driving dogs. This is a typical example of the combined strength, tightness and flexibility which characterize American Flexible Metal Hose and Tubing. Photo courtesy Wm. Sellers & Company Division, Consolidated Machine Tool Corporation, Rochester, N. Y.

EYE EXTENDER

Here's a handy gadget for oil burner and air conditioning installers and repair men—an inspection mirror on a flexible arm utilizing American 7/32" Flexible Steel Tubing. Adjusts to any position of the familiar "gooseneck" lamp arm, for which millions of feet of this American Lamp Arm Tubing have been used. Photo courtesy Eddington Metal Specialty Company, Eddington, Pa.

OIL CONVEYOR

Here's a rough, tough job for American Flexible Metal Hose—transferring heavy road oil from tank truck to sprinkler. Naturally, this service calls for dependable performance under conditions of abrasion, abuse, corrosion, chemical attack and exposure to elements.

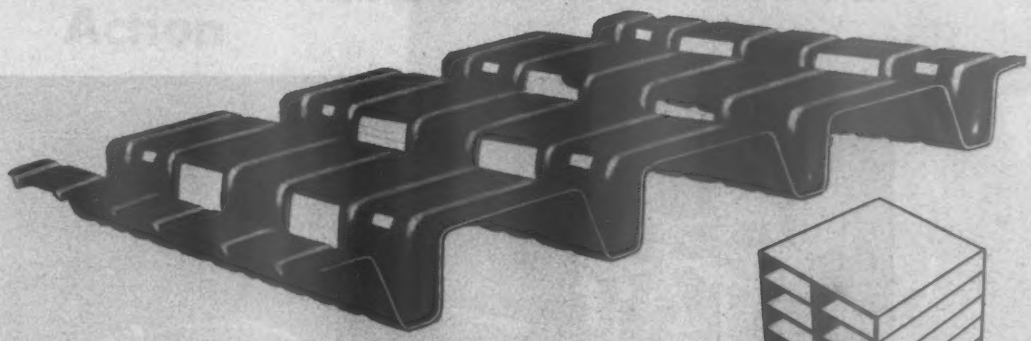
wherever connectors must move . . .

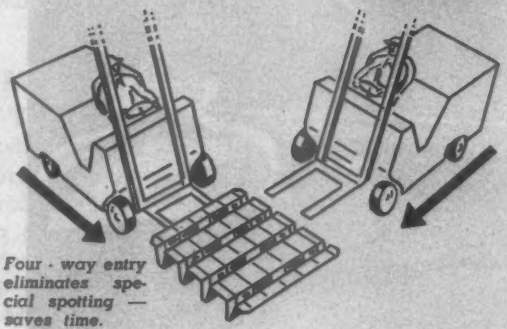
ANACONDA

American **FLEXIBLE METAL HOSE AND TUBING**

Keep things moving

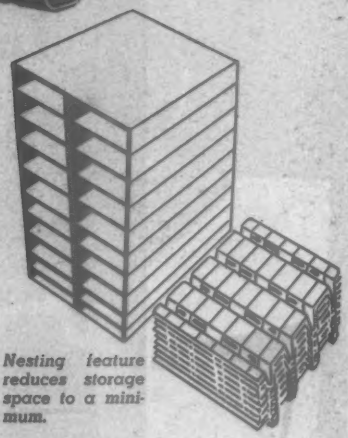
with POWELL NESTEEL PALLETS





Four - way entry eliminates special spotting — saves time.

Light weight permits ease of handling.



Nesting feature reduces storage space to a minimum.

The most versatile pallet made, Nesteel, since its introduction, has become one of the most popular pallets used by industry today.

Nesteel has many important advantages over pallets of conventional design. The nesting feature means a saving of more than 75 percent in storage space of empty pallets, and the deep corrugations stabilize pallet packs. This means they are ideal for ship-and-return operation.

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Send Inquiries to Dept. 1101

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ORIGINATORS OF COLD FORMED ALL STEEL MATERIALS HANDLING EQUIPMENT

HUBBARD, OHIO (In Greater Youngstown)

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INDUSTRIAL NEWS, BEGINNING ON THIS PAGE

TIMELY HINTS TO BETTER MANAGEMENT ON PAGE 258

QUOTES FROM INDUSTRY'S LEADERS ON PAGE 266

IDEAS TO STIMULATE YOUR THINKING, ON EVERY PAGE

INDUSTRIAL NEWS

FINGERS OF PRESS FEEDER, ready to remove finished part and load another.

New Press Feeder Assures Operator Safety

The aim of this new device is to feed and unload presses at speeds up to 1200 pieces per hour—and with complete safety for the operator. Also, it's intended to prevent breakage by stopping the press if a part sticks in the die.

HOW IT WORKS · The operator places the blank at the pick-up station (at right in photo). Fingers of the leading arm pick up the blank. At the same time, fingers of the unloading arm raise the piece that is on the die. Then both arms swing counter-clockwise, moving the blank to the die, the finished piece to the discharge station. The fingers then release the pieces, the arms swing back, and the press is triggered.

SET-UP IS EASY · Quickly interchangeable fingers are available for handling any straight side or tapered part with an outside diameter of 1 to 6⅝ inches, an inch or more high. Flat blanks (for first draw) require suction cups. Unit is a product of Magnaflux Corporation, 5900 Northwest Highway, Chicago.

Turn the page

Oil Burner Performance Revolutionized by

Coppus-Dennis FANMIX® Action

Jet reaction of steam-atomized oil is utilized in Coppus-Dennis FANMIX Oil Burners to rotate a fan which is an integral part of the burner. The air delivered by the fan is forced through a sheet of atomized oil, discharged from jets on a rotating disc. An ideal mixture for fast, complete combustion and peak efficiency is thus created.

FIELD-TESTED FOR MORE THAN 2 YEARS

Thoroughly proved in important installations for more than two years, these unique burners have proved profitable investments wherever used. In one of its plants, the American Woolen Company equipped two 1000 hp boilers with six Coppus-Dennis FANMIX Oil Burners.

In Terre Haute, Indiana, Type DC FANMIX Oil Burners were installed early in 1948 on two fully automatic 250 hp steam generators in the Commercial Solvents Corporation plant. They were supplemented by a third FANMIX Oil Burner when another boiler was installed.

ONLY FANMIX OIL BURNERS GIVE YOU ALL 6 FEATURES

1. **INCREASED BOILER RATINGS.** All your furnace is used for combustion, none for mixing. You get higher unit heat releases.
2. **STEPPED UP FUEL EFFICIENCY.** Complete combustion guaranteed with 5% to 10% excess air.
3. **NO "HOT SPOTS."** Continuous explosion kills torch action and disperses heat uniformly throughout furnace.
4. **FORCED DRAFT EQUIPMENT ELIMINATED.** FANMIX action overcomes entire draft loss across burners. No blowers, duct work needed.
5. **STACK REQUIREMENTS CUT** in new installations. Boiler ratings increased with your present stack. Forced draft created by FANMIX action requires less furnace draft.
6. **COKING OF ATOMIZERS REDUCED.** Tips air cooled by fan blades to point well below coking temperature. Less downtime, lower maintenance costs.

ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

IT WILL PAY YOU to learn the full details on why Coppus-Dennis FANMIX Oil Burners, made to Coppus "Blue Ribbon" standards of quality, promise superior performance. Send coupon today.

COPPUS ENGINEERING CORPORATION
110 Park Avenue,
Worcester 2, Mass.
Please send complete data on Coppus-Dennis FANMIX Oil Burners.

Name ..... Title .....
Company .....
Address .....
City ..... Zone ..... State .....

ASK ANY QUALIFIED AND IMPARTIAL AUTHORITY . . . HE'LL TELL YOU . . .

YOUR *BEST* PROTECTION

FOR FLAMMABLE LIQUID, GAS AND ELECTRICAL FIRES

ANSUL

DRY CHEMICAL

FIRE EXTINGUISHING EQUIPMENT

You, who have seen or used an Ansul Dry Chemical Extinguisher at a fire demonstration or on an actual fire, quickly recognized its superior fire-fighting capabilities. Further investigation proves that Ansul "Water-tight Construction" provides greater dependability under severe exposure conditions.

Ansul Hand Portable Models — 4, 4-B, 20-B and 30-B.

Fire Chiefs, insurance inspectors, safety engineers, etc. recognize Ansul as the leader in the dry chemical extinguisher field. Ansul Fire Extinguishing Equipment and *"PLUS-FIFTY"* Dry Chemical have set unparalleled standards of quality for the fire extinguisher industry.

You get *complete* dry chemical fire protection only from Ansul. There is an Ansul Dry Chemical Fire Extinguisher of the proper size for almost every flammable liquid, gas and electrical fire hazard.

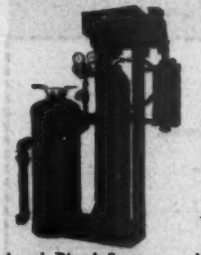
Safeguard your plant and irreplaceable equipment with the *BEST* fire extinguishing equipment available. Protect them with ANSUL EXTINGUISHERS.

ANSUL EXCLUSIVE FEATURES

- Patented Nozzle assures most effective stream pattern . . . Best results by inexperienced operators.
- Special packings in Nozzle and other parts exclude water.
- Corrosion resistant construction throughout.
- Easy on-the-spot Recharging (No tools needed).
- Quick, *positive* puncture operation.
- Special guard protects cartridge . . . rugged construction throughout.
- Ansul *"PLUS-FIFTY"*® Dry Chemical used exclusively.
- Field tested by thousands of satisfied customers.
- Ansul LT Models are the only dry chemical extinguishers listed by U.L. for operation at –65° F.

Ansul Wheeled Portable Models — 150-A and 350-A.

Ansul Mobile Units—Mine Cars, Trailers, Jeep Equipped and Fire Trucks.



Ansul Piped Systems and Stationary Units.

Send for File No. 702. You will receive a variety of helpful printed matter. Included is our latest catalog which describes Ansul Extinguishers of all sizes — from the small Ansul Model 4 to Ansul Piped Systems and Ansul 2000 lb. Stationary Units.

ANSUL

CHEMICAL COMPANY

Fire Extinguisher Division

MARINETTE • WISCONSIN

DISTRIBUTORS IN ALL PRINCIPAL CITIES IN THE U. S. A., CANADA AND OTHER COUNTRIES

YOU MUSTN'T MISS—

Begins on page 246

"Chromalloy" Gives Mild Steel Some Properties of Stainless

A possible answer to the shortage of heat- and corrosion-resistant steels was announced recently by the Chromalloy Corporation of New York. With this process, Chromalloy can diffuse chromium into the surface of relatively-easy-to-get low carbon steel, give it properties comparable to stainless steel.

TEST RESULTS GOOD • "Chromalloyed" low carbon steel has withstood 300-hour salt-spray and humidity tests. It isn't touched by hot 50% nitric acid solutions. It's processed surface is a dull silver gray, but for applications where appearance is important (auto chrome, for example) it can be mirror-bright.

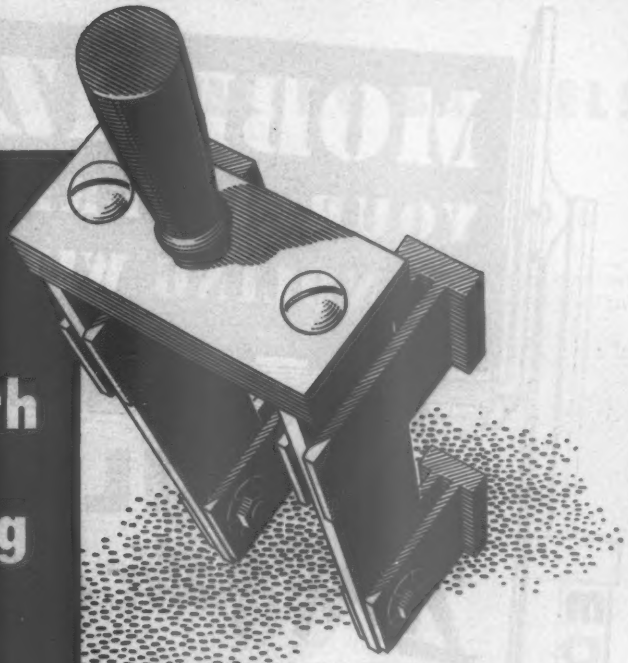
NO PEELING OR CHIPPING • The surface of a Chromalloyed part is permanent—there's nothing to crack or peel off, as in plating. The chromium is diffused into the steel to a depth of 0.002 to 0.008 of an inch. There's no change in dimensions. This means that you can machine a precision-fit part out of easy-to-work mild steel, process it afterwards. And reap two savings—in material cost, and in machining cost.

APPLICATIONS BROAD • The British have found, in year-long tests, that Chromalloyed jet exhaust stacks can take the tremendously hot and corrosive gases without forming heat scale. And, says Chromalloy, the process is a natural for turning out furnace elements, engine parts, non-corrosive pipe (where heat- and corrosion-resistance are important); tools, dies, lathe beds, etc. (where wear is severe).

Chromalloy's address: 109 West 64th St., New York 23.

Turn the page

They Save $358.54 a Month by not Pulling this Switch



Every day the machinery in a Clinton, Mass. plant* had to be stopped for a half hour while those machines were lubricated. Every stop meant lost production time plus a $14 expenditure for lubrication.

The Clinton people called in an Alemite Lubrication Engineer. They wanted to know if they could eliminate the costly interruption in production time. They felt that lubrication was costing them too much.

The Alemite Lubrication Engineer studied their problem and recommended a system that automatically lubricates the machinery without any shut-down. What's more, lubrication cost was cut from $14 a day to only 21c a day. That saving alone paid for the entire investment in just 43 days.

Call Your Alemite Lubrication Engineer
No matter what size or type of plant you operate, Alemite can show you dozens of ways to save through the more efficient handling of petroleum products. Call your local Alemite Industrial Distributor now or send for the free booklet "11 Ways to Cut Production Costs." Simply attach the coupon below to your letterhead. Dept. C-101, 1850 Diversey Parkway, Chicago 14, Ill.

*Name on request.

ALEMITE

MEANS EVERYTHING FOR LUBRICATION
1. Methods 2. Lubricants 3. Equipment
Another Product of Stewart-Warner

Alemite Cuts Costs 3 Ways

1. In transferring lubricants... cuts man hours 63% for every 100 pounds transferred. No mess, no contamination.

2. In loading grease guns... saves 3¾ man hours for every 100 pounds of lubricant loaded into hand guns.

3. In applying lubricants... saves up to 23.9 man hours for every 100 pounds of lubricant applied to bearings.

FREE! Valuable booklet—
"11 Ways to Cut Production Cost"
(Simply attach to your letterhead)
ALEMITE, Dept. C-101
1850 Diversey Parkway, Chicago 14, Ill.
We'll include facts on the new Alemite Oil-Mist System, too—(OIL-MIST atomizes oil into mist, circulates it to bearings under pressure. Increases life of bearings as much as 17½ times).

Name .....

Company .....

City ..... State .....

MOBILIZE
YOUR MATERIALS
HANDLING WITH...
MOBILIFT
Lev-R-Matic DRIVE
FORK LIFT TRUCKS
Mobilize your materials handling and production flow with MOBILIFTS. Only MOBILIFT has Lev-R-Matic push-pull grouped controls and no gears to shift...roller chain lift for full visibility between uprights...compactness for speedy maneuverability in narrow aisles and tight places.
Lower maintenance and operating cost. Get more work done in less time with MOBILIFTS — engineered and built to meet stepped-up demands of modern industry.
STAND-UP MODEL "E"
2,000-lb. cap. on 15" load center. Mast ht. 63" (Free lift 37"; Lift ht. 68"; Mast ht. extended 94") outside turning radius 57". Also available with 72" and 83" Mast.
SIT-DOWN MODEL "ER"
2,000-lb. cap. on 15" load center. Mast ht. 83" (Free lift 57"; Lift ht. 108"; Mast ht. extended 134") outside turning radius 63". Also available with 63" Mast.
WRITE TODAY FOR COMPLETE SPECIFICATION
ON MOBILIFT LEV-R-MATIC DRIVE FORK LIFT TRUCKS.
MOBILIFT
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835 S. E. MAIN ST., PORTLAND 14, OREGON
2317 W. 18th, CHICAGO • 790 Patterson Ave., E. RUTHERFORD, N. J.
1113 Spring St. N. W., ATLANTA • 2724 Taylor St., DALLAS
2730 San Pablo Ave., BERKELEY

YOU MUSTN'T MISS—

Begins on page 246

"Society" and "Institute" Have No Connection

Don't confuse the American Society of Industrial Engineers, of Detroit, with the American Institute of Industrial Engineers.

The National Better Business Bureau and the Detroit BBB have announced their objections to the type of "merit award" being granted by the Society. The Society has failed to answer requests by the Detroit BBB for information on the extent of competitive testing carried on by the Society before it issues its awards. The advertising trade press has publicized the matter widely, since several large and well-known corporations have featured the "merit awards" in their advertising.

Because of the similarity in the names of the organizations, the Institute's officers are anxious that no one think the Institute has any connection with the Society.

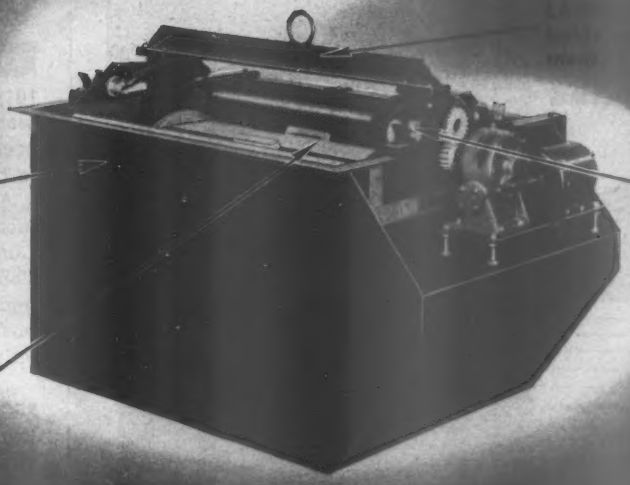
Black Box Pinpoints Damage to Shipments

Having trouble with "damaged in shipment" complaints? You can find out when damage occurred, how bad the jolt was, with a new impact recorder built by the Impact-O-Graph Corporation of Cleveland.

The unit has a small, battery-driven motor which drives a wax-coated tape. Motor will run for 28 days. There are three scriber arms which operate independently, record shocks in all three planes. By checking the tape after delivery, you get a "play by play" description of the journey. The scribe marks on the tape show the direction and severity of any impacts; and, since the tape is moving at constant speed, the time of the impact.

Turn the page

ONLY Udylite PLATING BARRELS GIVE YOU ALL THIS . . .



member
align-

ED (look-
—Large
mmodate
ling coils

DEEP-DIP DESIGN—
Allows cylinder to hang
deep in tank.

and Savings, too!

No other plating barrel can match the Udylite Barrel in QUALITY, EFFICIENCY and DURABILITY. Udylite Barrels plate the work—not the cylinder. Electrical insulation is arranged so that ALL the current flows directly to the work pieces. Cathode leads are encased in unbroken insulation . . . panels cannot absorb solution . . . there is no possibility of any element of a Udylite Barrel diverting current from the work being processed.

This not only results in faster, more uniform plating but also gives a substantial savings in current consumption.

On the basis of actual service records, the Udylite Plating Barrel lasts longer and produces more work with lower operating and maintenance costs than any barrel built! Ask your Udylite Technical Man about it. Or write *The Udylite Corporation, Detroit 11, Michigan,* for full details. There's no obligation.

Visit our exhibit at the 33rd National Metal Exposition and Congress at Michigan State Fair Grounds, Detroit, October 15-19, Booths 235-330-342 in Building "D".

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

Generalift pallet boxes provide...

THE ANSWER TO MATERIALS HANDLING PROBLEMS...

...AND THE ANSWER TO STORAGE PROBLEMS

FOR LARGE BUSINESS
FOR SMALL BUSINESS • FOR ALL BUSINESS!

The Generalift Pallet Box is new . . . it has had a truly amazing acceptance among practically all types of manufacturers! It sharply reduces costs because *one* workman, fork-lift truck, and Generalift Pallet Box, do the work of many! If you are interested in sharply cutting your materials handling and storage costs, write today for complete information on this versatile container.

WE WILL MAIL FREE COPY OF "THE GENERAL BOX"
This colorful booklet illustrates and describes the many advantages of the Generalift Pallet Box. We will be glad to mail upon request.

General BOX COMPANY
engineered shipping containers
GENERAL OFFICES:
504 N. Dearborn Street, Chicago 10, Ill.

DISTRICT OFFICES AND PLANTS:
Cincinnati, Danville, N. J., Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, Sheboygan, Winchendon • Continental Box Company Inc., Houston, Dallas • General Box Company of Mississippi, Meridian, Miss.

ALL TYPES OF ENGINEERED SHIPPING CONTAINERS

General Wirebound Crate | General Nailed Box | General Corrugated Box | General Cleated Corrugated Container | General All-Round Box | Generalift Pallet and Pallet Box | General Watkins-Type Box

YOU MUSTN'T MISS—

Begins on page 246

Industry Lagging in Insurance Coverage

The value of industry's plants and equipment has increased between 100% and 150% in the last 10 years. Yet only 2% of those plants and their equipment have been appraised recently enough to be fully covered by insurance.

And, according to a study just completed by the American Lumbermen's Mutual Casualty Company, only 47 out of 100 middle-sized companies had any business-interruption insurance; only eight were fully protected.

RECORD LOSSES • This year's fire loss (in terms of adjusted dollar values) is lower than for any year between 1921 and 1933, the years when organized fire protection was gathering steam. But actual dollar losses are now running at the record-breaking rate of $750-million a year. Says the report: Businessmen "may not be aware of how badly inflation threatens them in an unsuspected quarter like fire." Aside from the increased dollar value of facilities lost by fire or other disaster, downtime for companies that are able to recover is greatly increased by today's scarcity of machinery, equipment, building supplies. "Meanwhile," reads the report, "part of the payroll, taxes, interest, and other charges continue, and customers are lost."

INSURANCE ON SUPPLIERS • A recent trend on the debit side is the practice among many corporations of buying insurance protecting them against shutdowns of important suppliers. This form of protection has gained importance because at the present time most suppliers have all the customers they can handle, may be unable or unwilling to take on another customer if a company's regular source fails.

Turn the page

NEW — a low-cost* whiteprinter

ANNOUNCING BRUNING'S MODEL 20 COPYFLEX

Here's the new Bruning Model 20 Copyflex. Because of its low price, thousands of companies now can make their own whiteprints and thus realize a substantial saving. Now you can produce your whiteprints *when* you want them—as you want them.

It will pay for itself by producing sharp, clean prints of your engineering drawings as well as copying your production orders, reports, specifications, defense order copies, etc.

The Model 20 is a completely new, medium volume machine of advanced design, yet sells for the lowest price of any machine in its class. It has a full 46" printing width, and takes cut or roll stock.

Compare these advantages

- ***LOWEST PRICED** machine of its class available.
- **NO FUMES.** Bruning Copyflex machines use no vapor developer, therefore cannot possibly emit unpleasant fumes.
- **NO INSTALLATION.** No exhausts needed. Just connect to an ordinary 115 volt AC electric power circuit.
- **EASY OPERATION.** No training needed—anyone can operate a Copyflex.

See how the Model 20 Copyflex, or one of our other models, can help you. There is a model for every price and volume requirement. Clip the coupon now and you'll be on the road to faster, less expensive copying.

BRUNING

Specialists in copying since 1897

CHARLES BRUNING COMPANY, INC.

Dept. F-101 100 Reade St. New York 13, N. Y.

☐ Send me full details on the Model 20 Copyflex.

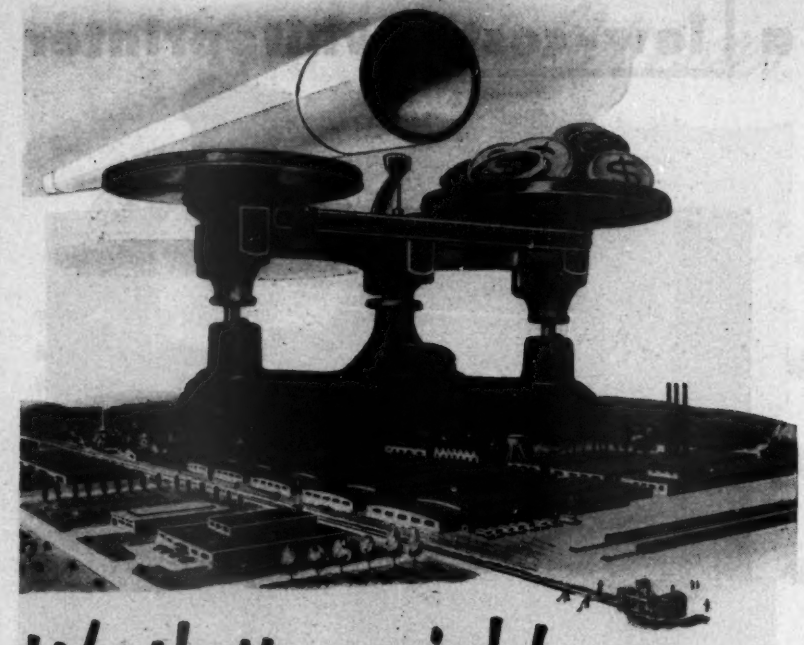
☐ I would like to see a Copyflex machine demonstrated.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____



Worth its weight

. . . in installation savings

PLANT ENGINEERS have found, when they specify Transite Pressure Pipe, that trench excavation, pipe-laying, and backfilling follow in quick succession . . . a fast assembly-line type of operation that saves both time and money.

Here's how Transite Pressure Pipe speeds operations:

It's easy to handle. Unloading and other handling operations are simplified because it is light in weight. More footage can be carried per truckload, trucking costs are lowered, and distribution on the job is faster. Most sizes can be lowered into the trench by hand, or with the aid of simple rope slings.

"Factory-made" joints are tight yet flexible. Specially designed Simplex Couplings require no calking or hot compounds. They are quickly and easily assembled to form an unusually tight joint . . . have flexibility which permits laying the pipe around wide curves without special fittings.

Assembly can be checked as pipe is laid. Joints can be checked for proper assembly by means of a simple gauge immediately after the pipe ends are joined. This permits backfilling to follow rapidly. The job can be "buttoned up" much faster.

Used for water supply, fire and process lines, Transite Pressure Pipe has demonstrated its ability to provide efficient, economical service over a period of years. Made of asbestos, cement and silica by a special Johns-Manville process, it is pressure steam-cured for extra corrosion resistance. And, of course, it cannot tuberculate. For further information, write to Johns-Manville, Box 290, New York 16, New York.

Transite is a registered Johns-Manville trade mark

JM

Johns-Manville

TRANSITE PRESSURE PIPE

for Water Supply Lines • for Fire Lines • for Process Lines

YOU MUSTN'T MISS—

Begins on page 246

THIS GEAR is one of a warehouse of parts that Caterpillar had to salvage after Kansas flood.

Production Line Clean-Up After August Flood

This summer's flood left a mass clean-up job in its wake. The Kansas City parts depot of Caterpillar Tractor Company adopted production-line techniques to do the job.

An inspection showed that most of the stored parts, all rustproofed before they were put on the shelves, had come through unscathed. So all parts were sent down a temporary production line. There they were steam-cleaned to remove the mud, degreased, given another rust-preventive coating, and re-packaged.

Said D. M. Gilbert, parts manager at the depot: "It will be impossible to tell a part that went through the flood from one fresh from the factory."

Effects of Inflation on Executive's Salary

In 1940, after he paid his taxes, the $10,000 a year executive had $9138 left to sped. In 1951, after taxes, his real earnings (adjusted in terms of 1940 dollars) are $4831—a 47% decrease.

Turn the page

Buy the right HYSTER 20 to fit your particular job

6 variations of one basic model...select the one that best suits your needs

What lifting and transporting capacity do you require from a lift truck? In the HYSTER 20 you can have a model with—

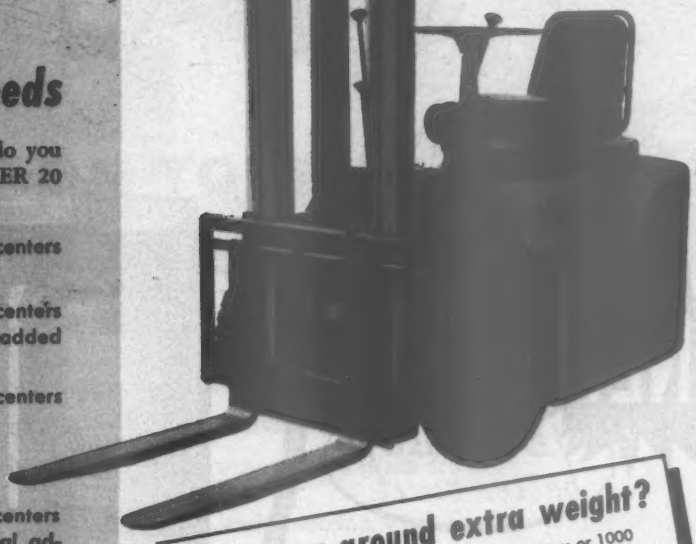
1) **2000 lbs.** capacity at 15" load centers (Standard Hyster 20)
2) **2000 lbs.** capacity at 24" load centers (Optional additional counterweight added to Standard 20)
3) **1300 lbs.** capacity at 15" load centers (Skeleton counterweight)
4) **1000 lbs.** capacity at 24" load centers (Skeleton counterweight)
5) **2000 lbs.** capacity at 15" load centers (Skeleton counterweight plus optional additional counterweight)
6) **1500 lbs.** capacity at 24" load centers (Skeleton counterweight plus optional additional counterweight)

Where the transporting of 2000 lbs. on 24" load centers is a prime requirement, the installation of the additional optional counterweight to the standard 20 model achieves the necessary result.

The Hyster 20 with skeleton counterweight is of great importance where floor load limits exist; where elevator lifting capacities are materials handling factors; and where a high percentage of the loads are in the 1000 lb. range.

By quickly installing the additional optional counterweight to this same Hyster 20 with skeleton counterweight, lifting capacities are increased from 1300 lbs. to 2000 lbs. at 15" load centers; and increased from 1000 lbs. to 1500 lbs. at 24" load centers. This gives the owner a 2-in-1 lift truck combination.

The *right* Hyster 20 lift truck, with the *right attachments, tools and accessories,* becomes the greatest cost cutting machine in the entire field of materials handling equipment.



Why carry around extra weight?

The Hyster 20 for 1300 lbs. at 15" load centers or 1000 lbs. at 24" load centers has a skeleton counterweight that reduces the weight of the standard Model 20 by 600 lbs. This light weight but heavy duty fork lift truck will cut maintenance and operating costs; yet it will provide the maximum lifting and transporting capacities required in a great many industries.

The additional optional counterweights can be installed in less than 30 minutes; removed in much less time.

See your Hyster dealer for further information.

HYSTER COMPANY

THREE FACTORIES

2956 N. E. CLACKAMAS ST.... PORTLAND 8, OREGON
1856 NORTH ADAMS STREET... PEORIA 1, ILLINOIS
1056 MEYERS STREET..... DANVILLE, ILLINOIS

HYSTER

ANNOUNCING...

NEW BUFFALO better-built

STAINLESS STEEL DRY CHEMICAL FIRE EXTINGUISHERS

The NEW, durable, extremely light weight Buffalo *stainless steel* dry chemical extinguishers give instant protection against gasoline, paint, oil, varnish, alcohol . . . all flammable liquid fires. They are ideal for use in all types of industries and on Busses and Trucks. Simplicity of operation and extreme light weight are featured in the NEW Buffalo *stainless steel* dry chemical extinguisher. In use, it instantly releases a heat-resistant, flame-suffocating, chemical cloud-like stream, up to 20 feet. The insulating effect of the chemical cloud allows the operator to get to the seat of the fire. The efficiency of Buffalo *stainless steel* dry chemical extinguishers exceed Underwriters' Laboratories requirements.

The NEW Buffalo *stainless steel* dry chemical extinguishers are available in two models: 20 pound; and 30 pound sizes. Consult your classified telephone directory or write for your nearest Buffalo representative.

- INSTANT FINGER TIP CONTROL
- LIGHT WEIGHT . . . EASY TO HANDLE
- STAINLESS STEEL CONSTRUCTION
- LONGER RANGE

Underwriters' Laboratories Approved

BUFFALO FIRE APPLIANCE CORPORATION

DAYTON 1, OHIO

YOU MUSTN'T MISS—

Begins on page 246

New Hobbing Machine Doubles Cutting Speeds

You can cut gears twice as fast with Michigan Tool Company's new gear hobber. And the machine will be able to cut gears at speeds up to 1000 rpm. as soon as carbide hobs are available.

How's this hobber different? Company engineers say they've made it more rigid, eliminated many slides and gear trains, substituted hydraulic feeds, added a flywheel to smooth operations. And, they say, it's a natural for automatic loading. Company's address: 720 E. Nichols Rd., Detroit.

Non-Wage Benefits Equal 16% of Payroll

A study of 690 companies in all lines of business shows that more than 50 types of non-wage benefits were paid to workers in 1949, and that they amounted to 16% of the total payroll.

Economic Intelligence, issued by the U.S. Chamber of Commerce, listed these sample items: employer contributions to pension and private insurance plans, 4.4% of payroll; paid vacations, 3.3%. In all, non-wage payments came to 23.7 cents an hour, $477 a year per employee.

Just One More Flood Story . . .

Milk cans, wash tubs, and wastebaskets were put into use to help save microfilm records during the recent Kansas flood.

Industry was advised by the Kansas City branch of Recordak Corporation, Eastman Kodak subsidiary, to send in their salvaged microfilm rolls for restoration. But, said Recordak, keep them under water. That's where the strange conglomeration of containers came in.

Turn the page

"Gravy ON YOUR HAIR?"

Just because gravy goes swell over noodles, he shouldn't assume it's good on hair, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

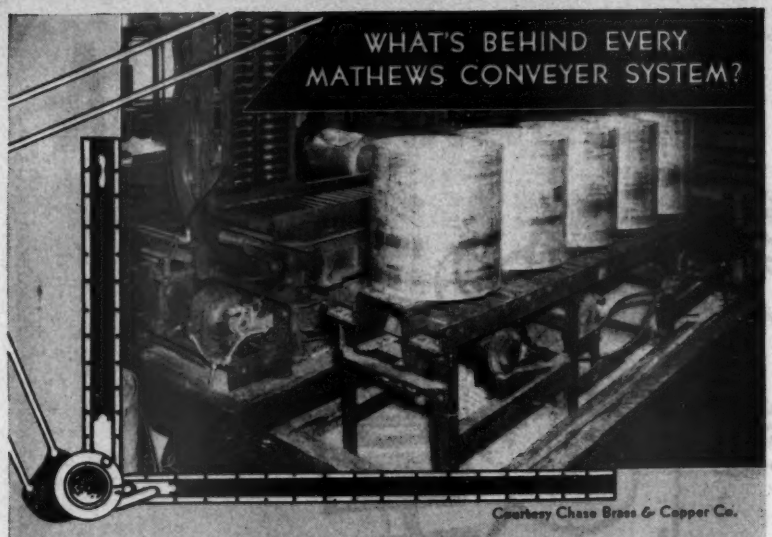
OIL CUPS permit you to lubricate each bearing with the oil best suited to that bearing—thus prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production. And oil cups fortunately *cost very little.*

Gits oil cups have been the standard for industry for more than 40 years. Gits Bros. has the largest selection of oil cups available anywhere. Call on Gits Bros. for a prompt, efficient solution to your lubrication problems.

Write for free Price Guide Catalog

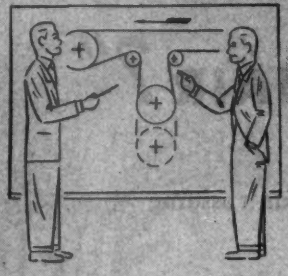
GITS BROS. MFG. CO.

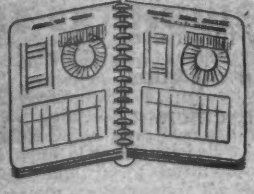
1831 S. Kilbourn Ave. • Chicago 23, Illinois



Courtesy Chase Brass & Copper Co.

SOUND ENGINEERING PRACTICE





● The conveyer system which does the best possible job is the system that was specifically designed to meet the requirements of that job. There is quite a lot of know-how in designing and fabricating conveying equipment, and no place for trial and error methods. It just costs too much to learn the hard way—by actual application—that equipment is too light, poorly constructed, or just improperly designed to do the work.

Mathews Conveyer Systems are made up of Power and Gravity Conveyers and special conveying machinery that is built on sound engineering principles—equipment that is designed to do a specific job well. That's why, when you are buying conveyers, whatever the application might be, you can be sure about this: If it's Mathews equipment, it has to be right.

Engineering offices or sales agencies are located in principal cities in the United States and Canada.

MATHEWS CONVEYERS

GENERAL OFFICES . . . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIVISION . . *Mathews Conveyer Company West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

YOU MUSTN'T MISS—

Begins on page 246

TIMELY HINTS

Electroformed Dies Do Good Job, Cost Less

Electroformed dies—made by plating a thin layer of nickel or other metal on a mold—are being used successfully in several industries. The process is not new, but its use in making dies is. The first set of electroformed dies has been in use in a West Coast aircraft plant for less than a year.

MANY ADVANTAGES CLAIMED · Records kept on sets of dies already produced show that the over-all cost varied from 40% to 60% of the cost of making the same dies by conventional methods. In addition, says the manufacturer (Bone Engineering Corporation of Glendale, Calif.) the dies offer these advantages: (1) they have a superior surface; (2) are lighter in weight; (3) require no hand fitting (freeing skilled diemakers for other work); (4) will duplicate tooling exactly; (5) have superior part-release properties.

HOW THEY'RE MADE · The dies are made by placing a phenolic resin matrix, or mold, into an electroforming bath, where the desired thickness of metal (usually 3/16 to 1/4 inch) is deposited. The matrix is removed by stripping or melting.

An all-nickel deposit makes the best dies. But nickel is in critical supply. So most dies are now being made of electroformed iron, with a 0.010-in. nickel face. Saves nickel, but it costs more.

Turn the page

Raincoats for structures...

Sprayed, Brushed or Troweled on!

Keep moisture at bay... it wreaks havoc!

Specify Flintkote Protective Coatings . . . for structural steel, exposed concrete, inside surfaces of masonry, insulation materials . . . wherever dampness and corrosion are a problem.

Flintkote Protective Coatings are available in both asphalt cutback and emulsion types, and can be applied by spray, brush or trowel.

Whatever your waterproofing or dampproofing system, choose from mastics, semi-mastics and liquid-asphaltic compounds . . . fibrated, non-fibrated Flintkote Protective Coatings.

Available also are asphalt primers, caulking compounds, membrane reinforcing and spandrel cloth—all of them effective "raincoats" for guarding structures against moisture.

Write for complete specifications and application data on using these efficient materials in both new construction and maintenance.

THE FLINTKOTE COMPANY, *Industrial Products Division,*
30 Rockefeller Plaza, New York 20, N. Y.
Atlanta • Boston • Chicago Heights • Detroit
Los Angeles • New Orleans • Washington
The Flintkote Company of Canada, Ltd., 30th Street, Long Branch, Toronto: also Montreal

FLINTKOTE *Products for Industry*

Move More... Faster...at Lower Cost

WITH BUDA Fork Trucks AND Attachments

AND many others too numerous to mention

You can't match the new Buda 2000 lb. capacity fork-lift trucks for speed, economical operation and material handling capacity. Available in pneumatic and solid or cushion-tired models with a variety of time and cost saving attachments. See the new Budas at your nearby Buda Distributors today—they're way ahead in every way!

Write for Bulletin and Complete data
The Buda Company, Harvey, Illinois

BH-32

The Line with All 3 for Diversified Handling

BUDA

Manufacturers of Diesel and Gasoline Engines, Maintenance of Way Products, Lifting Jacks, Earth Drills and Material Handling Equipment

YOU MUSTN'T MISS—

Begins on page 246

Follow-Up Report: Sulphur Shortage May Be Over

Just last month (FACTORY, September, 1951, page 262) we told about the sulphur shortage, closed by saying that ". . . unless new discoveries of large brimstone deposits are made" the solution would lie in developing other high cost sources.

Three weeks later, the Freeport Sulphur Company announced the discovery of a new deposit, described as good for 500,000 tons a year. The rich deposit was found in the marshes of the lower Mississippi delta. It's brimstone—easiest and cheapest to process.

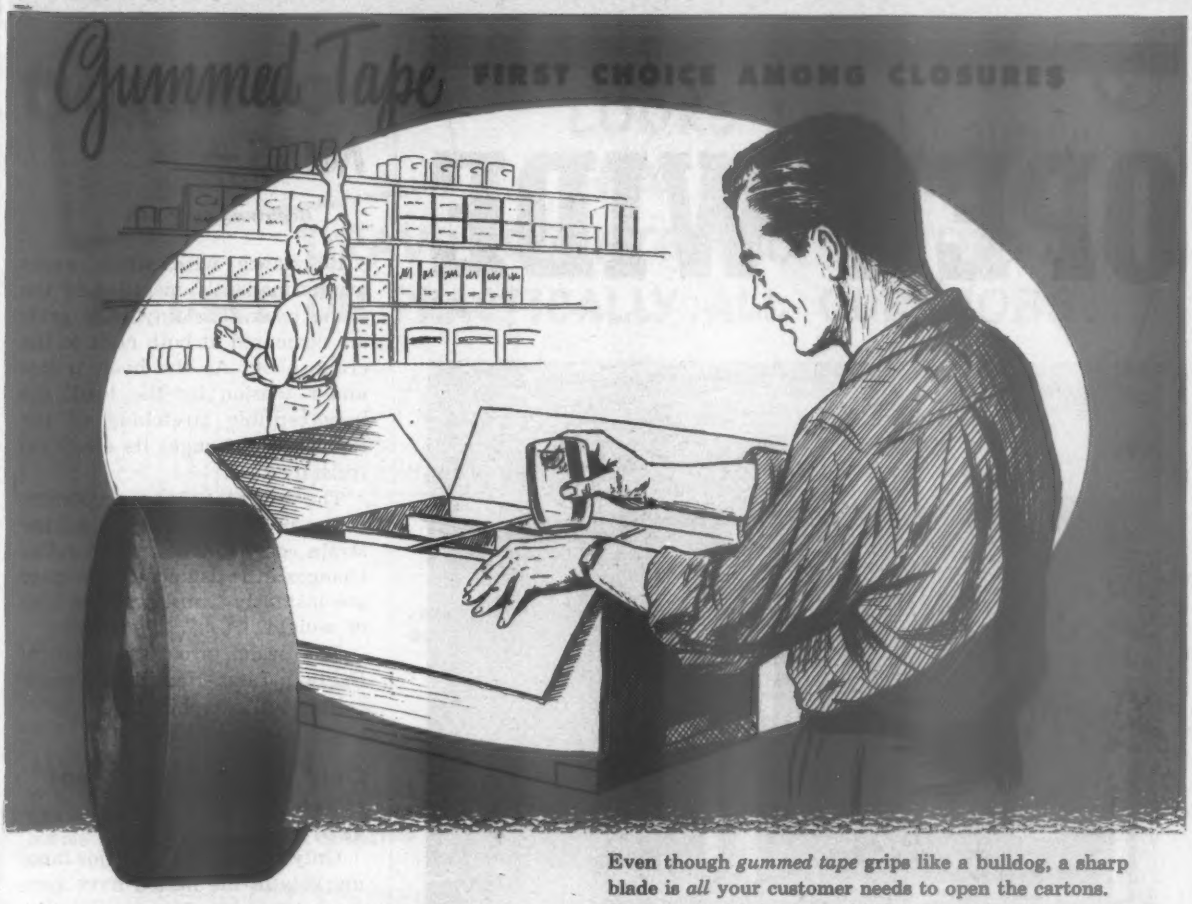
Dr. James Boyd, head of the Defense Minerals Administration, said that if the new project were tapped as planned, "the shortage should be over in 1953."

STRAIN GAGE indicator gives weight of heavy G-E transformer as it's lifted by crane.

Electronic Crane Scales Weigh Massive Equipment

Massive parts and equipment weighing up to 150 tons can be easily and quickly weighed as they're lifted by the crane. Tiny pieces of wire, finer than human hair, do the trick.

Turn the page



only GUMMED TAPE makes a carton so EASY TO OPEN AND RE-USE

Even though *gummed tape* grips like a bulldog, a sharp blade is *all* your customer needs to open the cartons. He doesn't risk injury to his hands or his newly-acquired merchandise. And, a vital advantage today, the carton is unharmed—ready for re-use.

Gummed tape gives merchandise better protection in transit, too. The moisture and grime of shipping cannot infiltrate its adhesive barrier. It reinforces cartons at their weakest points—corners and seams. Because gummed tape is a flexible closure, it helps cartons take shock without splitting or bursting.

You win friends by using gummed tape to provide better protection, easier opening and longer service from cartons.

Orange Core makes your shipping dollars go further

ORANGE CORE

IS A BETTER TAPE BECAUSE IT'S... *Supple-ized**

Your shipping room employees work faster with Orange Core because it's Supple-ized. This exclusive process makes Orange Core more flexible, easier to use, faster to apply. For proof, try it and see why Orange Core is...

"The world's largest selling gummed tape"

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GUMMED SEALING TAPE

Available plain or printed, in choice of widths, weights, lengths and colors.

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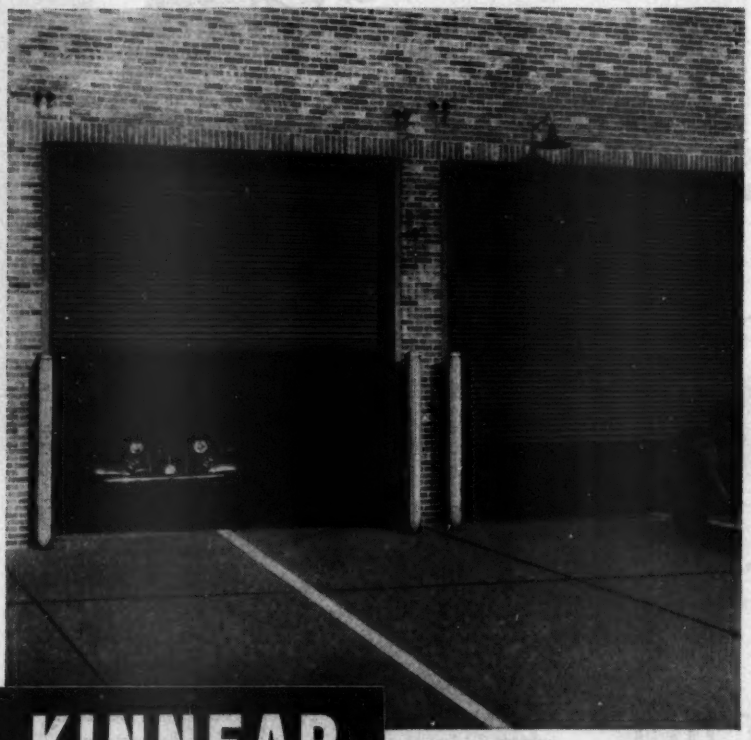
OPEN WIDE



KINNEAR Rolling Doors

Clear The Entire Opening

You get full use of all doorway space when you equip openings with Kinnear Rolling Doors. They clear the doorway completely—from jamb to jamb and from floor to lintel. Even the floor, wall and ceiling space *around* the doorway remains clear and usable at all times.

The doors rise straight upward, coiling above the lintel. Trucks, material, or equipment can be left within inches of the door curtain, both inside and outside the entrance, without blocking door action in any way.

The rugged all-steel construction of Kinnear Rolling Doors assures an extra measure of protection against theft, intrusion, storm damage, and fire. Kinnear Rolling Doors are built any size, with manual, mechanical or motor operation. Write for complete information.

The KINNEAR Manufacturing Co.

1540-60 Fields Ave., Columbus 16, Ohio — 1742 Yosemite Ave., San Francisco 24, Calif.

Offices and Agents in All Principal Cities

SAVING WAYS IN DOORWAYS — KINNEAR ROLLING DOORS

YOU MUSTN'T MISS—

Begins on page 246

Resistance wire strain gages are permanently installed in the crane hook. The tiny wire grids are cemented at both ends to the crane hook. As the hook is put under tension by the load, the imperceptible stretching of the strain gage changes its electrical resistance.

The indicator that the operator is reading is connected to the strain gage in the hook. The changes in resistance of the gage are instantly translated into tons of weight.

The scales are a product of Baldwin-Lima-Hamilton Corporation, Philadelphia 42.

Only Six Defense Areas Have Bad Worker Shortages

Only six of the 166 major labor markets in the nation have serious shortages. Here's the list, and reasons for the shortages, as given by the Labor Department: Hartford, Wichita, Indianapolis, and San Diego are having trouble because of aircraft plant expansions. Build-up of the machinery industry and heavy hiring at a government arsenal in the Davenport-Rock Island-Moline area on the Iowa-Illinois border has caused a shortage there. And the new Savannah River atomic energy project has created a serious labor demand in Aiken, S.C., and Augusta, Ga.

SOME AREAS HAVE SURPLUS • 62 labor markets have a balanced labor supply. There's a "moderate" labor surplus in 84, and 14 have "substantial" surpluses.

New England has the biggest surplus. Two-thirds of the major labor markets there have moderate or substantial numbers of unemployed. One of the main reasons: layoffs in the big textile industry there.

Turn the page

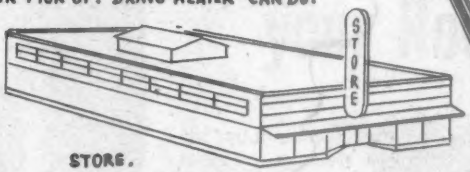
NOTES FROM AN ARCHITECT'S SKETCH PAD

LOOKS LIKE THAT VERSATILE DRAVO "COUNTERFLO" HEATER CAN BE USED ON PRACTICALLY ALL OUR JOBS.

SCHOOL DISTRICT BUDGET LIMITED. CAN SAVE WITH DRAVO HEATERS.

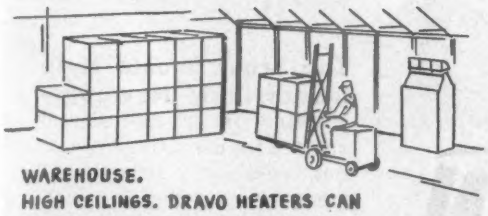
CHURCH. INTERMITTENT HEATING. NEEDS QUICK PICK-UP. DRAVO HEATER CAN DO.

ARMY BASE.
WINTER CONSTRUCTION ON THESE BARRACKS. CAN INSTALL DRAVO HEATERS EARLY FOR HEAT DURING CONSTRUCTION AND AFTER COMPLETION.



STORE.
WITH DRAVO HEATERS, CAN USE ONE SET OF DUCTS FOR HEATING AND AIR-CONDITIONING.

INDUSTRIAL PLANT.
DRAVO HEATERS HAVE 150' AIR THROW. NO DUCTS NEEDED.



WAREHOUSE.
HIGH CEILINGS. DRAVO HEATERS CAN REDUCE ROOF HEAT LOSS, KEEP HEAT WHERE IT'S NEEDED.

DIESEL RAILROAD SHOP.
NEEDS HEAT AT WORKING LEVEL.
DRAVO HEATERS IDEAL.

PROCESS INDUSTRY.
CURING AND DRYING.
SPECIFY DRAVO HERE.

FOUNDRY.
EXHAUST EQUIPMENT CREATES HEATING AND VENTILATING PROBLEM.
USE DRAVO HEATERS FOR TEMPERED "MAKE-UP" AIR.

A case study on any [illegible] installations is yours for the asking. For complete information on how Dravo "Counterflo" Heaters can help solve your heating problems, write for Bulletin IM-52-35.

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HEATING DEPARTMENT, DRAVO BUILDING, PITTSBURGH 22, PA.

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Offices in Principal Cities

You can SEE the Superiority of Alvey-Ferguson Conveyor Engineering

YOU MUSTN'T MISS—

Begins on page 246

Blackout Aid: Phosphorescent Signs

Suppose an emergency occurred during the graveyard shift at your plant, and all the lights went out. Would you be able to find the first aid kits, the fire hose or extinguishers, emergency switches? Just in case you can't see in the dark, you might think about using phosphorescent signs.

According to the manufacturer, the signs retain an afterglow for from eight to 12 hours, are visible from 15 to 20 feet. Signs are available from stock bearing such old saws as "Shelter" and "Exit," but you can have them made with any legend you need.

The new signs, called "Phosphor-Lites," are manufactured by Norco Products Manufacturing Company, 392 Bleecker St., New York 14.

Top Brass Should Help Indoctrinate Newcomers

More effective use should be made of top executives' personalities, background, and accomplishments in winning and holding the loyalities of new employees. That's the conclusion of a recent survey of orientation and indoctrination programs made by Fisher & Rudge, New York management consultants.

"Of the 42 well-known companies which figured in the survey," said Mr. Fisher, "fewer than one-third give any information about officers and top executives to the new employees, and less than half formally introduce new workers to the executives with whom they will have contact."

Not only is a formalized plan important, he said, "but our experience proves that the more the higher executives participate in the process, the better and more lasting the results will be."

Turn the page

WHEN YOU'RE ALREADY RUNNING

FULL BLAST!

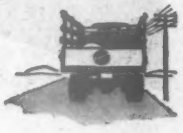
let Barrett SPEED your Roofing Jobs!

On top of all your other responsibilities, why worry about roofs . . . not only the condition of your present roofs, but also the quality of materials and workmanship and the time it will take to build any new roof you may need?

And you won't have to, if you rely on Barrett! Barrett can give you the world's longest-lasting built-up roof in the shortest possible time. For Barrett *speeds* your roofing jobs in 4 important ways.

1 **BARRETT SPEEDS** specifications. Ready at hand are Barrett time-tested, scientifically calculated application specifications for almost every built-up roofing problem. These are so foolproof that Barrett Specification* Roofs can be bonded for 20 years, and generally last much longer. Approved by the National Board of Fire Underwriters—Class A.

2 **BARRETT SPEEDS** deliveries. Strategically located supply points enable us to rush materials to your Barrett roofing contractor, and to your job when they are needed.



3 **BARRETT SPEEDS** application. Barrett does not have to rely on outside sources of supply for roofing pitch and felt. Because Barrett Specification* pitch and felt are made in our own factories, production can be controlled to meet demands. Your Barrett roofer can be sure that he will get the materials he wants when he needs them. No time lost on the job! Moreover, he can be sure that these materials will be of uniform high quality.

4 **BARRETT SPEEDS** you the finest possible roof. Skilled workmen make for fast jobs. Barrett Approved Roofers have had many years of practical experience, plus well-trained manpower, plus Barrett engineering help, to assure you the finest possible roofing job in the shortest possible time.

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ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

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1327 Erie Street, Birmingham 8, Alabama
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In Canada: The Barrett Company, Ltd., 5551 St. Hubert St., Montreal, P. Q.

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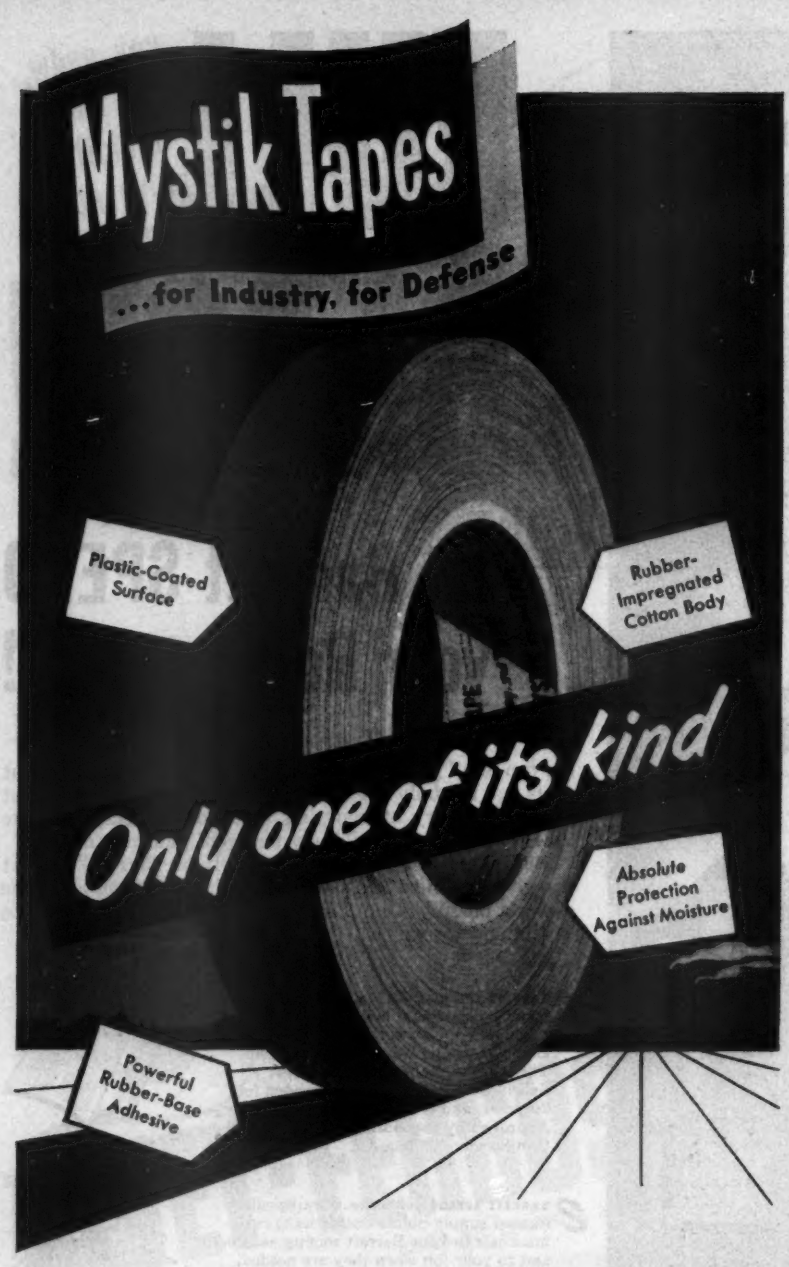
Barrett Specification Roofs



- Mystik Cloth Tapes
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MYSTIK TAPE type 6000-A, is the only tape made that complies with government specifications JAN-P-127 Type I *Grade-A*. That means no moisture, not a drop, can seep through this tape. For the answer to *your* shipping problems *wherever you want maximum* protection against deteriorating elements, get MYSTIK TAPE, 6000-A. Write today for full information and samples on this and other pressure-sensitive MYSTIK Tapes. Mystik Adhesive Products, 2642 N. Kildare, Chicago 39.

YOU MUSTN'T MISS—

Begins on page 246

QUOTES

Businessmen Help NPA

"The National Production Authority work could not have been undertaken nor carried on without the valued help of experienced businessmen who know what they are doing when they deal with business problems."—*Charles Sawyer*, Secretary of Commerce.

Labor and the State

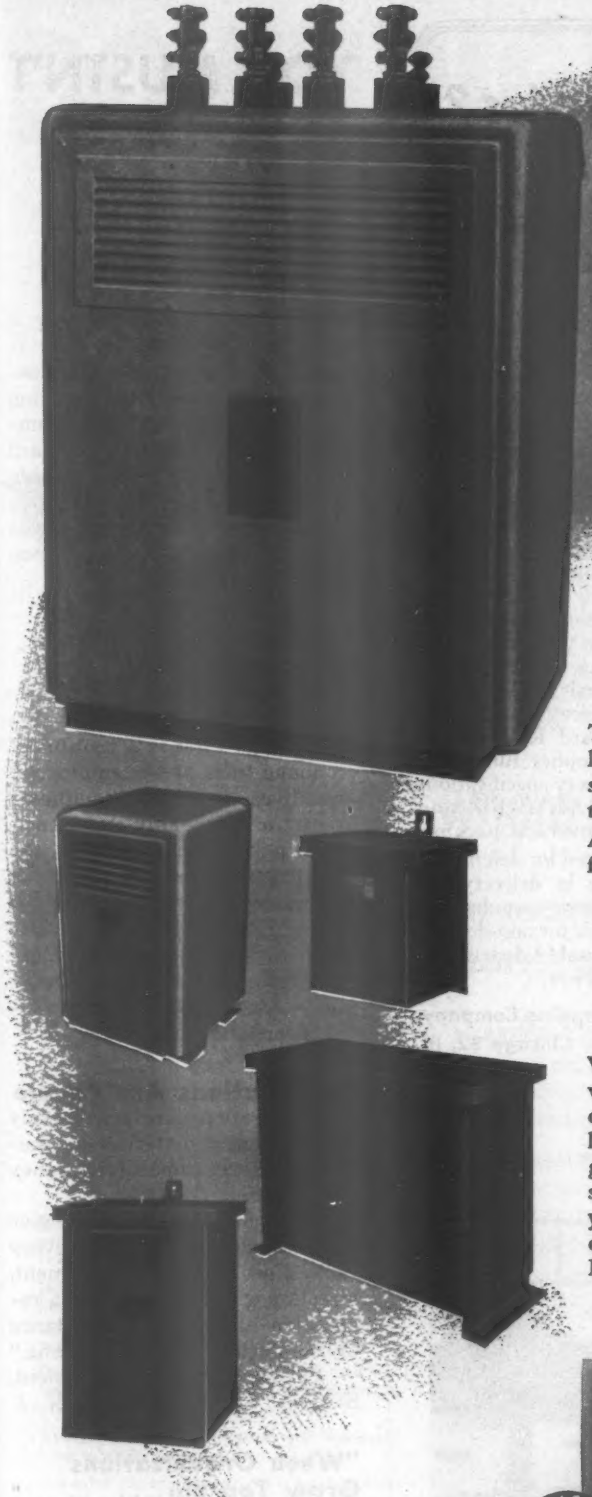
"Labor plays a vital part in the functioning of the modern state. If labor can be confused and embittered, if labor can be made to lose faith in the community of which it forms a part, then the core of any national society is threatened.

"The enemies of democracy know this, and it explains the efforts they make to undermine the confidence of the labor element in the stability of our institutions and the soundness of our traditions."—*General George C. Marshall*, Secretary of Defense.

If Better Morale Saved One Hour a Week . . .

"If each employee of a firm employing 10,000 would save an hour each week, because of improved morale, for 50 weeks, there would be a saving of 500,000 man-hours. . . . Assuming the average cost of a man-hour of work to be 75 cents, an annual saving of $375,000 would be realized. . . . It would take a $5-million increase in sales, assuming a profit rate of 7.5% of sales, to earn $375,000."—*W. V. Owen*, of Purdue University.

Turn the page



MORE KVA PER POUND!

Lightweight, dry-type transformers save space, cut installation costs. 3 through 167 kva, single phase, or 9 through 225 kva, three phase.

They're lighter and smaller! Compact, completely ventilated coils on Hipersil® cores—neatly enclosed in sheet steel cases for convenience of mounting, cleanliness, trim appearance.

Add all this to the savings inherent in dry-type transformer design:

NO VAULTS. Mount them on the floor, walls, posts or overhead platforms, close to the load they serve. They're safe.

SIMPLIFIED MAINTENANCE. No liquids to store, filter or replace. No gauges, radiators, valves or gaskets to get out of order.

Westinghouse Dry-Type Transformers are available for voltage step-down or step-up applications or for phase changing. Types AJRB and AVRB (3 through 100 kva) have circuit breakers built into the high-voltage circuit, giving 3-way protection against damaging overloads or short circuits, cutting installation time up to 50%. Ask your Westinghouse representative for a copy of B-4428, or write Westinghouse Electric Corporation, P. O. Box No. 868, Pittsburgh 30, Pennsylvania. J-70607

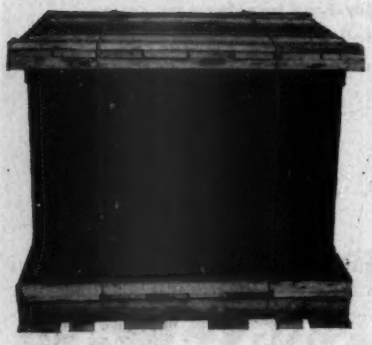
YOU CAN BE SURE... IF IT'S

Westinghouse

DRY-TYPE TRANSFORMERS

Need strapping for defense orders?
Perhaps we can help!

Gerrard Round Steel Strapping complies with JAN-P-106A, JAN-P-107 and JAN-P-108



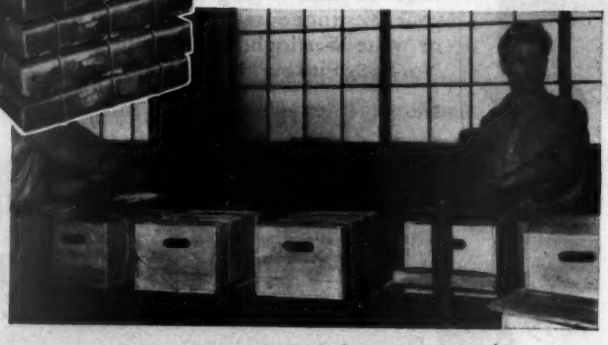
Gerrard Round Steel Strapping holds these shell cases firmly. Palletizing permits quick packing and handling.

● A Gerrard engineer will gladly give you all possible help with your defense packaging problems. Frequently, he can show you how to get more use out of your steel strapping by bundling, palletizing or using the Diagonal Tie. You can depend on his advice . . . and on the strength of Gerrard Round Steel Strapping. It complies fully with the joint Army-Navy specifications JAN-P-106A, JAN-P-107 and JAN-P-108 for overseas packing.

Strapping ordered for defense receives preference in delivery according to current regulations. Strapping available for non-defense uses is being equitably distributed among our customers.

Gerrard Steel Strapping Company, 2927 W. 47th St., Chicago 32, Ill.

Steel sheets are securely Gerrard-strapped for export. Round strapping permits bundles to slide over each other without tearing the straps.



Machine on suspension arm speeds up tying operation.

USS

GERRARD ROUND STEEL STRAPPING

UNITED STATES STEEL

YOU MUSTN'T MISS—

Begins on page 246

"It Must Occur to Sensible People . . .

. . . to ask themselves how it is, if the American system is wrong, that the American democracy of millions of hard-working people are able to keep themselves at a far higher standard of life than we are, and are able to lend us a helping hand and give us so much aid and bear so large a part of our burden."—*Winston Churchill.*

The Requirements for Distributing Ideas

"An effective program [for distributing ideas] has three requirements. First is a tankful of economic facts of the employees' own lives, instantly identifiable as part of their daily experience. The second requirement is the establishment of channels of communication — 'pipelines' — through which ideas can be distributed. The third requirement is the pump to do the distributing."—*Fred G. Clark,* The American Economic Foundation.

Corporations Are People

"Corporations are not merely aggregations of materials and machines. More importantly, they are people.

"Ways must be found to give the individual worker, at every rank, a sense of accomplishment, a feeling of personal worth, a realization of the true importance of his effort to the broad scheme." — *Eugene Holman,* president, Standard Oil Company of N. J.

"When Organizations Grow Too Big . . .

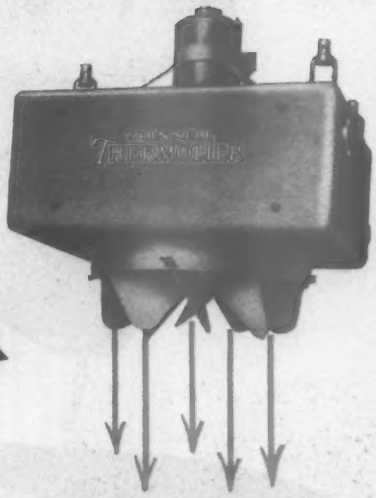
. . . they tend to spend too much of their time and energy just being organizations."—from *Management Briefs,* published by Rogers, Slade & Hill.

Turn the page

DOWNRIGHT

better performance

Vertical Delivery
THERMOLIER
Unit Heaters . . .



RIGHT DOWN

where maximum heat is desired...

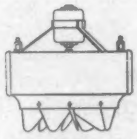
in warehouses, plants and other hard-to-heat buildings

HEATING COMFORT AND ECONOMY. Heat is forced down to the working level . . . not banked uselessly at the ceiling level. Thermoliers provide quick heating from a cold start. Desired room temperatures are easily maintained within a close range.

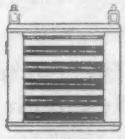
ADAPTABILITY TO EQUIPMENT AND FLOOR LAYOUT. The units and the simple piping are overhead where they do not interfere with arrangement of operating machinery or equipment and do not take up valuable floor or wall space. Units are easily relocated at any time to meet changes in plant layout or heating requirements.

LOW FIRST COST. Thermoliers are so efficient and so compact that their heating capacity is often equivalent to the capacity of cast iron radiation or pipe coils of twice the cost.

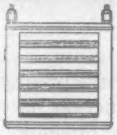
4 MODELS . . . . . 18 SIZES



Vertical Delivery



Horizontal Delivery



Textile Model

Velocity Nozzle

A thermostatic trap, the simplest and least expensive of all traps, is practical because of Thermolier's exclusive cooling leg.

Maximum capacity assured, annoying destructive water hammer eliminated — by built-in pitch of tubes and internal cooling leg which assure continuous drainage of condensate.

Damaging strains caused by expansion and contraction eliminated by "U" type expansion tubes.

Safety and durability assured with leak-proof tube-to-header construction.

Five other important constructic . 'eatures. Write for Thermolier Catalog.

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Grinnell Company Inc., Providence 1, Rhode Island • Sales Offices and Warehouses in Principal Cities

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

when you want tools fast

.... Phone your nearby *Snap-on* factory branch

● You'll talk to a *tool man* when you get your Snap-on branch on the wire. He'll understand your wants clearly, and help you select the most efficient tools for your needs. You'll get professional tools of the finest character — properly designed, strong, versatile, *safe*, Snap-on Tools—that will serve you long and well. For 30 years, plants—large and small—have used and endorsed this "time-saving way to buy time-saving tools." May we send you copies of the latest Snap-on Industrial and General Catalogs? Write—

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Syracuse 3, N. Y., 323 Irving Ave.
Toledo 6, Ohio, 2932 Monroe St.
Toronto 17, Ont., 130 Laird Drive
Vancouver, B. C., 1043 Davie St.
Winnipeg, Manitoba, 238 Garry St.

***Foremost* IN HAND TOOL ENGINEERING, MANUFACTURE, DISTRIBUTION**

YOU MUSTN'T MISS—

Begins on page 246

Cracks in the Foundation of Civilization

"The great civilizations of the past have risen in nation after nation to a pinnacle of glory, and have crumbled away again into the dust. They were not destroyed from without, by an atomic bomb. They were destroyed mostly from within, by decay and rot and greed and infamy.

"Today, in America, we have achieved the greatest of all of these civilizations; and yet most of us are so afraid that someone is going to drop an atom bomb on our heads that we do not even notice how the foundations of that civilization are beginning to crack beneath our feet."—*Benjamin F. Fairless,* president, U. S. Steel Corporation.

The Factors in Economic Progress

"Scientific discoveries would not yield practical results if we did not have invention; patented technological devices would be impotent without engineering applications to productive processes; engineering can function only in conjunction with a business organization able to appraise the commercial feasibility of new developments; individual business enterprise in turn will be thwarted if the economic system is defective; and, finally, the functioning of the economic system is dependent upon the character and administration of the governmental system." — *Dr. H. G. Moulton,* president, the Brookings Institution.

"You Cannot Help Men Permanently . . .

. . . by doing for them what they could and should do for themselves."—*Abraham Lincoln.*

Hear about the revolution in Cleveland?

Rolling out of Cleveland these days is a revolution in armored warfare.

It's the T-41 "Walker Bulldog"—the first U.S. tank to be built *around a gun* instead of an engine.

But the T-41 is involved in a *production* revolution, too! Though assembled in Cleveland, its actual parts and materials come from *two thousand* factories . . . in nearly every state!

This "production team" system is producing miracles. But it produces new timing problems, too. How do you bring in two thousand units . . . at the right time?

These production experts know the answer. When they want parts and materials fast, they use the service that *gets there first.* They use Air Express!

Whatever your business, Air Express speed can make your deadlines, increase your profits. Here's why!

IT'S FASTEST — Air Express gives the fastest, most complete door-to-door pick-up and delivery service in all cities and principal towns, *at no extra cost.*

IT'S MORE CONVENIENT—One call to Air Express Division of the Railway Express Agency arranges everything.

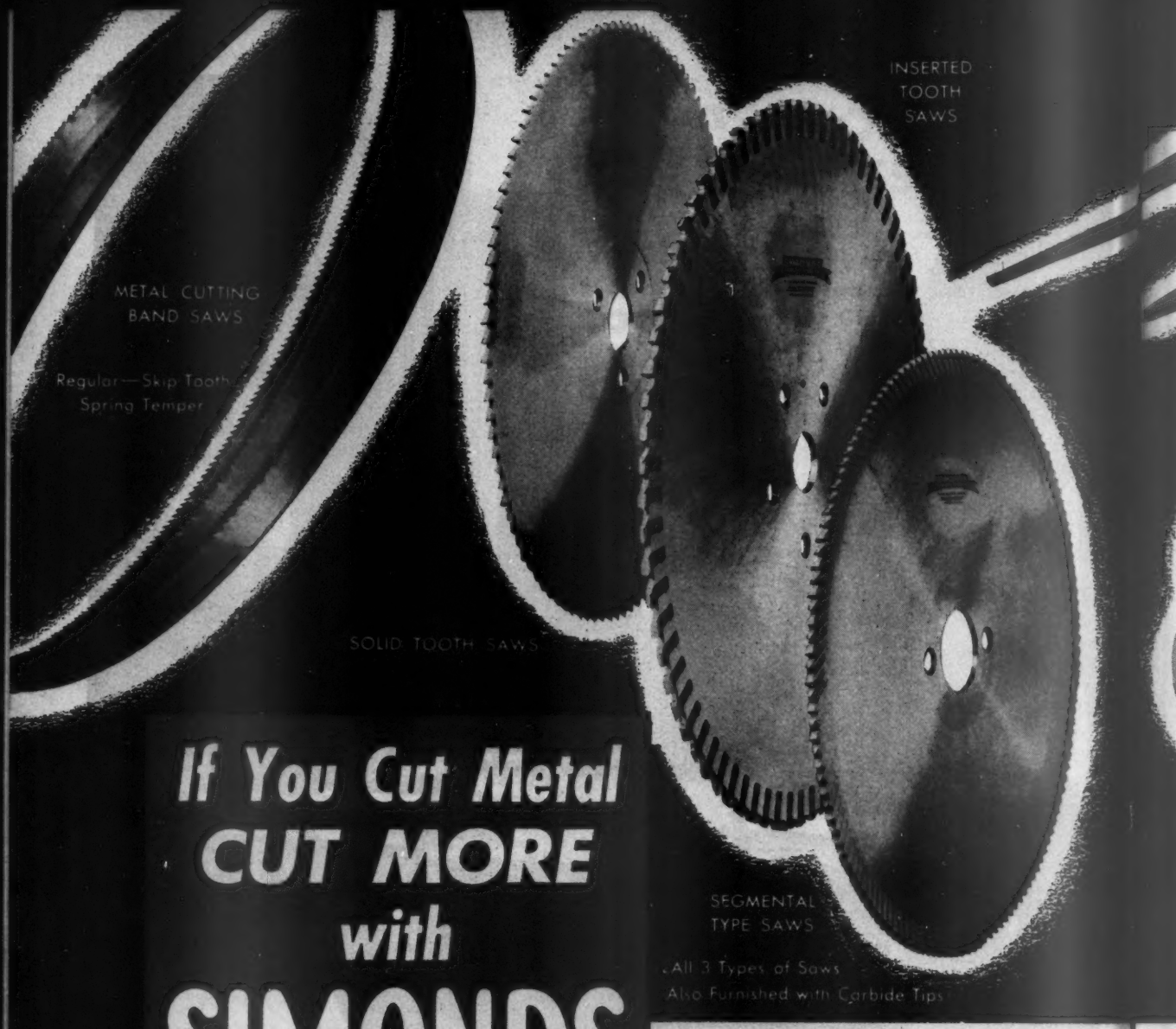
IT'S DEPENDABLE — Air Express provides one-carrier responsibility all the way and gets a *receipt upon delivery.*

IT'S PROFITABLE—Air Express expands profit-making opportunities in distribution and merchandising.

For more facts call Air Express Division of Railway Express Agency.

AIR EXPRESS

GETS THERE FIRST



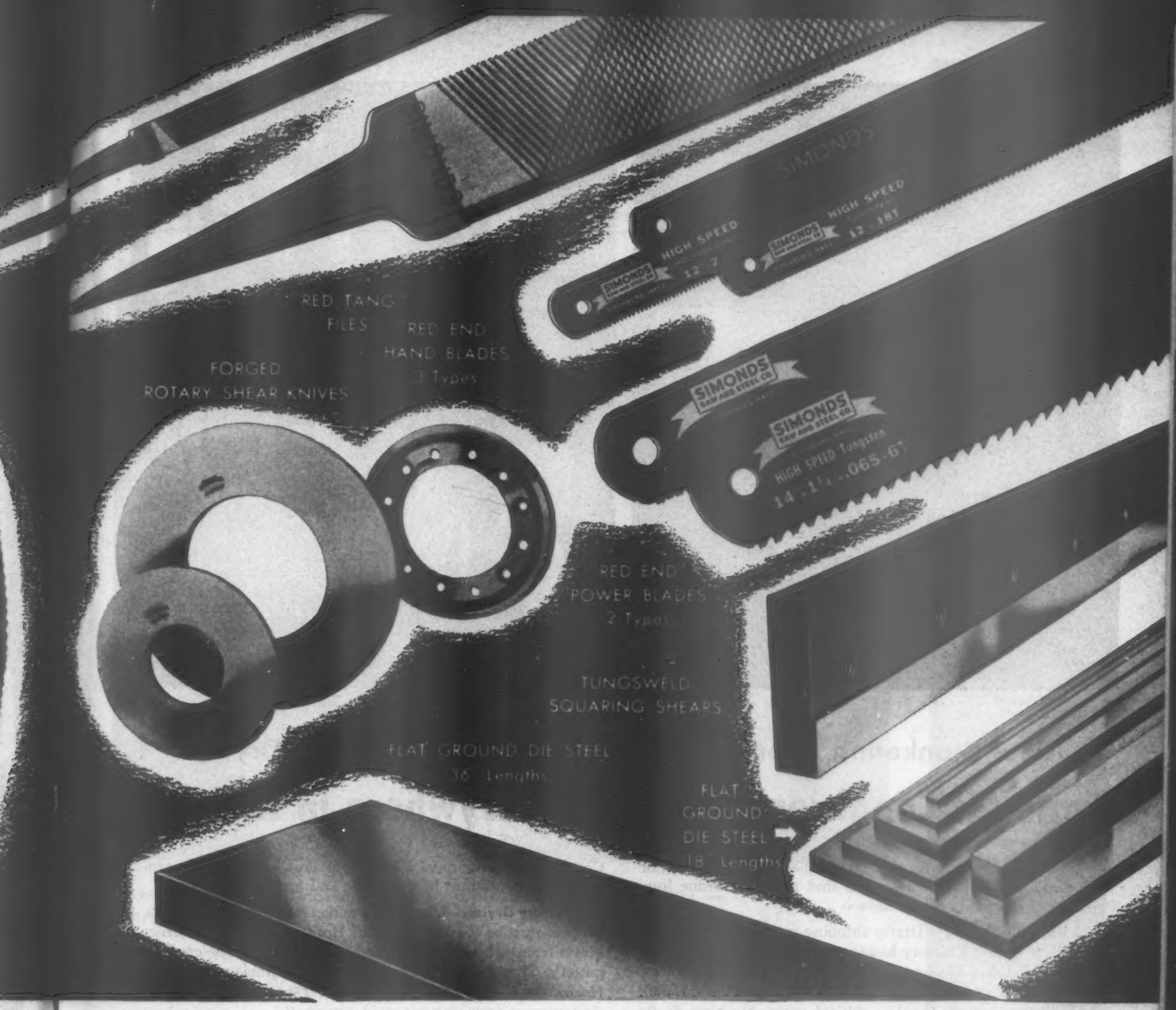
If You Cut Metal CUT MORE with SIMONDS Industrial Line

Over 100 years devoted to the ideal of developing the foremost line of cutting tools in this country . . . that's what underwrites every purchase you make of any product in the Simonds Line.

And don't forget this: **You get 100% Simonds Quality Control . . . beginning with steels processed *for your job* from Simonds own steel mills . . . and going all the way through Simonds famous Windowless Plant (first in this country).**

Here, in this completely controlled-conditions plant, modern straight-line production methods are

The Simonds Line is


RED TANG FILES
RED END HAND BLADES 3 Types
FORGED ROTARY SHEAR KNIVES
SIMONDS
HIGH SPEED
12 - 2
HIGH SPEED
12 - 18T
SIMONDS SAW AND STEEL CO.
HIGH SPEED Tungsten
14 - 1¼ - .065 - 6T
RED END POWER BLADES 2 Types
TUNGSWELD SQUARING SHEARS
FLAT GROUND DIE STEEL 36 Lengths
FLAT GROUND DIE STEEL 18 Lengths

implemented by special equipment to produce cutting tools of *one quality only* . . . Simonds TOP Quality.

And you can bank on it that these Simonds Tools will deliver top performance on *any* job . . . from hand filing and hacksawing, to production machine cutting with saws of all types and sizes. So, if low-cost and high-level production are vital to you . . . then specify "Simonds" to your distributor or dealer on any requirement you may have on which the tools shown above will serve.

Remember: *You start to save, the minute you say SIMONDS!*

SIMONDS
SAW AND STEEL CO.

Branch Offices in Boston, Chicago, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.

the Production Line

Door Blanketing, Food Processing, Tool Storage, Pottery Drying

Trane Air Conditioning Serves Everywhere in Industry

The right answer for any factory heating, ventilating or air conditioning problem — you'll find it in the Trane line, just as thousands of others have —

Door Blanketing — Drafty shipping rooms are a frequent hurdle to effective factory heating. One midwest steel manufacturer found a neat answer in Trane Projection Heaters. Installed at the ceiling, the units focus warmth at the shipping room doorway and at other critical spots, blocking drafts before they start.

Food Processing — A New Orleans food processor demanded two things of the air in his plant—it had to be just the right temperature and humidity the year-around; it had to be filtered. A complete air conditioning system, with Trane Climate Changers and Trane Compressors, meets both demands.

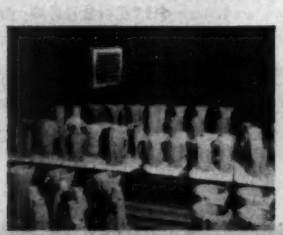
Tool and Gauge Storage — Gauge accuracy, guarded by closely controlled temperatures and humidity, was a must for a midwest bearing manufacturer. Trane Heating and Cooling Coils, Trane Centrifugal Fans and a Trane Compressor provide these conditions in the gauge and tool storage room.

Pottery Drying—When vases and ceramic statues dry, the process must be even and gradual. Hot streams of air or direct blasts from a heater make for uneven drying and cracked pottery. That's why a pottery maker in Illinois uses Trane Horizontal Unit Heaters and Louver Fin Diffusers to hold drying room temperatures even, constantly.

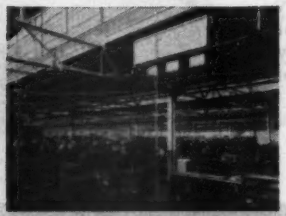
Area Heating — A sprawling plant and a huge open machine shop meant a big heating job in an eastern airplane factory. Trane Torridors, hanging at the ceiling, send a lot of Btu's a long way, so the shop is comfortable and production is humming.

Whatever your heating, cooling, ventilating or air conditioning problem is, look for the answer in the complete Trane line.

Tool Storage—Trane air conditioning keeps temperatures constant, delicate tools, gauges accurate.



Pottery Drying — Diffused heat from Trane Unit Heaters and Diffusers solves another drying problem.



Area Heating—A lot of heat sent a long way — Trane Torridor handles the big heating jobs easily.

TRANE

MANUFACTURING ENGINEERS
OF HEATING, VENTILATING AND
AIR CONDITIONING EQUIPMENT

THE TRANE COMPANY, LA CROSSE, WIS.
Eastern Mfg. Division . . . Scranton, Pennsylvania
Trane Company of Canada, Ltd. . . . Toronto
OFFICES IN 80 U. S. and 14 CANADIAN CITIES

DON'T BE PENNY WISE *and* DOLLAR FOOLISH WHEN IT COMES TO GEARS

Down time (for disassembly, gear replacement, reassembly) — 4 hrs. minimum $13.00

Loss of 4 hrs. profit and overhead on this job $48.00

Sixty dollars lost because they "saved" ten per cent on a $10.00 pair of gears by buying inferior gears that quickly wore out and had to be replaced by BOSTON Gears ..... NET LOSS $60.00

Standardize on Stock Boston Gears

Design them into your equipment

Always specify them for replacements

BOSTON GEAR WORKS

402 HAYWARD ST., QUINCY 71, MASS.

BOSTON Gear STOCKS ARE Here

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FOSTORIA INFRA-RED
Streamlines Production

FOR FINISH BAKING AND OTHER HEAT APPLICATIONS

Read these Results Typical of Thousands of FOSTORIA INFRA-RED INSTALLATIONS

EATON MFG. CO., Cleveland, Ohio, uses the 44 ft. 118 KW Fostoria oven, pictured above, to bake paint on auto heater parts. Mr. George Zidich, foreman of their subassembly dep't says: "The smoothness and efficiency of our entire operation depends upon our speedy Fostoria infra-red oven. We save drying time, and still get the kind of finish we want. Infra-red drying gives an even, longer lasting, tougher finish." Baking time on this completely conveyorized job is 3-2/10 minutes at 300°F.

Back of every Fostoria Infra-red oven recommendation are many years of intensive research — the foremost knowledge of Infra-red applications — the unequalled engineering skill and experience of many thousands of highly successful installations. Today, Fostoria Infra-red equipment is recognized as the highest efficiency standard of industry everywhere. Whatever your baking, drying, degreasing, or industrial heating problems may be, investigate now, the streamline efficiency and lower "per piece" production cost for your operations with Infra-red ovens as engineered by Fostoria.

SAVES SPACE

Fostoria Infra-red ovens operate on a comparatively short cycle which results in smaller oven requirements. They may also be suspended from ceiling mounts to eliminate floor space entirely.

SAVES TIME

Reduces processing time from hours to minutes because of the inherent speed of Infra-red. There is no time lag in starting an oven, the heat is instantaneous.

SAVES MANPOWER— MANHOURS

Ideal for conveyorized production methods. Reduces excessive product handling. Turns out more pieces per day with ease, with less people.

CUTS COSTS

Faster production, lower operating costs, improved quality, result in lowest "per piece" cost.

GET THE FACTS ON FOSTORIA "KNOW HOW" HELP TO REDUCE YOUR "PER PIECE" PRODUCTION COST

Write, today, for this factual information on the Infra-red process and equipment as engineered by Fostoria. Technical data applicable to your operations will be included if you send us general facts about your particular problem. A Fostoria representative will gladly analyze your production needs and submit definite recommendations and carefully forecasted results for your consideration.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO
Oldest and Largest Manufacturers of Industrial Infra-red Ovens

INFRA-RED fostoria SYSTEM

Good Ways to Solve Special
PLANT ENGINEERING PROBLEMS

Begins on page 148

TO KEEP INSTRUMENT AIR DRY: Automatic or semi-automatic dehumidifiers are described in bulletin DD-130 by Industrol Corp. Units are available in capacities from 35 to 200 scfm. air at 100 psig. and 70 deg. F. *(To get this bulletin check No. 39 on coupon, page 330.)*

TO KEEP PROCESS OIL BURNERS FROM SMOKING: You need precise control of the oil-flow valve. Catalog No. 704-A shows how the Hauck Micro-Cam valve gives quick, accurate regulation and meters oil flow. *(To get this bulletin check No. 40 on coupon, page 330.)*

HOW INCREASING YOUR STEAM COSTS CAN SAVE MONEY: This is the provocative title of Sarco's 16 question-and-answer bulletin. It's written in non-technical language every industrial executive can understand. Aim is to show how to use process steam most efficiently. *(To get this booklet, check No. 41 on coupon, page 330.)*

IF YOU PLAN A CIRCUIT-BREAKER PANELBOARD: Whether it's for lighting, appliances, or power applications, here's a 20-page booklet of ideas Westinghouse Electric Corp. thinks you should consider. *(To get this booklet, check No. 42 on coupon, page 330.)*

HOW TO REDUCE VIBRATION: American Felt Co.'s 20-page booklet shows how Vibra-Mount felt cushioning is applied to machine footings to reduce transmitted vibration up to 85%. *(To get this booklet, check No. 43 on coupon, page 330.)*

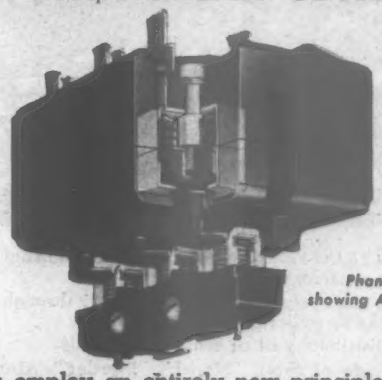
Turn the page

It's All NEW! TYPE AC Motor Starter

...with the sensational NEW multi-turn magnetic blowouts...

...and TWIN-BREAK CONTACTS

Here, for the first time is a rugged AC magnetic starter that provides the extra protection and dependable operation of "Mill-Type" heavy-duty construction and design.



Phantom view showing Arc-shield

Another CLARK FIRST

Type "CY" starters employ an entirely new principle of arc interruption. The arc is extinguished by the effect of the blow-out coil, *concentric with the contact*. The magnetic field quenches the arc either by lengthening or confining it. In its *forced rotation* it moves continually from a hot to a cold spot—minimizing burning or pitting of contacts. The ingenious design of the arc chamber prevents carbonization and the accumulation of hot gases between wiring terminals—minimizing phase-to-phase failures*.

One piece upper arc shell protects terminals from hot gases
Magnetic arc interrupters with steel arc chambers
Pressure type terminals line and load
Arc shields of inorganic non-carbonizing material
Finger clips for easy contact inspection
Silver double break control circuit contacts
Captive screws in contact arm
Melting alloy type overload relays
Easy coil replacement—only two screws and one pin to remove
Vertical lift magnet with steel guide uses no springs
FRONT

Open View

The Maintenance Man's Dream!

- **No filing, dressing or cleaning of contacts!**
- **No tools necessary to inspect contacts!**
- **Easy to change moving contacts!**
- **Stationary contacts changed quickly!**
- **Remove only two screws and one pin to change coils!**
- **Remove only four screws to take out stationary magnet frame!**
- **Power circuit contacts available with springs in complete packaged service kits for ease in stocking!**

*Magnetic blow-out coils are used on all size 2 and 3 Type "CY" starters. The same Mill-Type construction is used on sizes 0 and 1.

Let a CLARK application engineer show you what this new line of CLARK "CY" starters means to you in increased production and lower maintenance.

THE CLARK CONTROLLER CO.

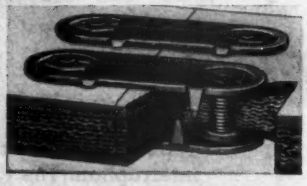
ENGINEERED ELECTRICAL CONTROL • 1142 EAST 152ND STREET, CLEVELAND 10, OHIO

FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, "Monel," "Everdur." Also "Promal" top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO., 4678 Lexington St., Chicago 44, Ill.

AERVOID AIDS to speeded-up industrial feeding

HOT FOODS HOT SOUPS

HOT LIQUIDS

AerVoiD Hot Food Carriers, AerVoiD Hot Liquid Carriers, AerVoiD Mobile Canteen

Hot flavorful foods kept hot by AerVoiD high vacuum insulation for workers that cannot come to a cafeteria without too much loss of time. A hot coffee pick-up for workers at their work with AerVoiD vacuum insulated liquid carriers. Hot coffee and light refreshments serviced directly to workers at their work with the AerVoiD narrow aisle Mobile Canteen.

In peace or defense industrial feeding AerVoiDs do a job that cannot be accomplished with any other equipment . . . because AerVoiDs alone do the job of transporting and distributing of hot foods for service a distance from the kitchens where they are prepared.

AERVOID MOBILE CANTEEN

WRITE TODAY

for illustrated bulletin "The Job AerVoiDs Do In Industrial Feeding" and special circular on "AerVoiDs In Defense Industrial Feeding."

VACUUM CAN COMPANY

19 South Hoyne Avenue — Chicago 12, Illinois

AERVOID *vacuum insulated*
HOT FOOD, SOUP, AND COFFEE CARRIERS

Good Ways to Solve Special

PLANT ENGINEERING PROBLEMS

Begins on page 276

HOW TO GET—OR GET RID OF —VARYING VOLTAGES: You can get a variable output voltage from a constant supply voltage. Or you can maintain a closely regulated output voltage from a varying supply voltage. Bulletin describes General Electric Co.'s induction voltage regulators for 600-volt single-phase indoor service on circuits 3 to 240 kva. *(To get this bulletin, check No. 44 on coupon, page 330.)*

HOW TO REMOVE SLUDGE FROM OIL STORAGE TANKS: It's simple and economical, says Magnus Chemical Co., even on tanks too small for a man to enter. You spray on a special mixture of Magnusol HD, and flush off the muck with water. For detailed instructions write Magnus at South Ave., Garwood, N.J.

CARE OF LEAD-ACID STORAGE BATTERIES: A 56-page handbook from Gould-National Batteries, Inc., tells a plant engineer all he needs to know to supervise maintenance, repair, and operation of motive-power battery equipment. And it instructs the maintenance man down to the last detail. *(To get this handbook, check No. 45 on coupon, page 330.)*

HARD TO REPLACE THAT WORN-OUT WINDOW SASH? Try a non-critical material, suggests American Structural Products Company — Insulux glass block. A 16-page booklet shows how easily you can do it, and what long life you can expect under rugged conditions. *(To get this booklet, check No. 46 on coupon, page 330.)*

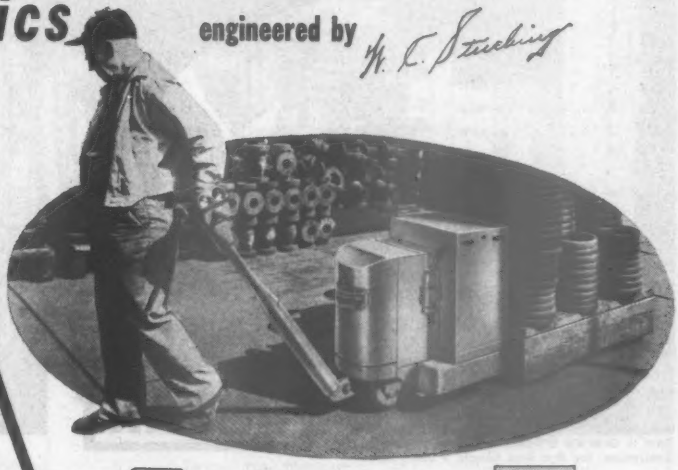
Turn the page

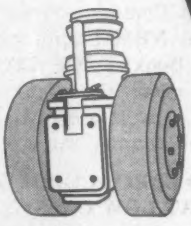
7 reasons

why America's leading firms select HydroLectrics

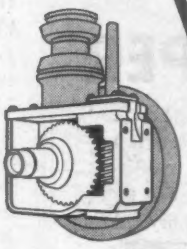
engineered by W. C. Stuebing

Why do large and small users of the HydroLectric lift truck report these Stuebing-built trucks save them money . . . last up to four times longer? Here are seven reasons mentioned again and again . . . no other truck gives them all!

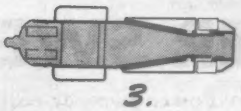




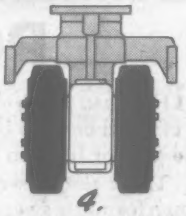
1. **True Differential Drive** . . . no chains—complete reliability!



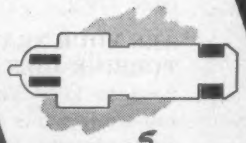
2. **Lifetime Transmission** . . . sealed in lubricant—no maintenance!



3. **Rugged Construction** . . . built to last longer, where the going is toughest!



4. **Twin Drive Wheels...** 50% easier steering, far better traction!



5. **Four-Wheel Stability** . . . greater safety for operator and load!

6. **Greater Safety** . . . brake operates instantly, with handle in any position!

7. **Trouble-free "Power Package"** . . . compact, quickly accessible!

LIFT TRUCKS INC. THE STUEBINGS CINCINNATI

Put the HydroLectric to work in your plant. We'll gladly send descriptive literature. Write for Bulletin "A".

Lift Trucks INCORPORATED

2425 SPRING GROVE AVENUE, CINCINNATI 14, OHIO

it paid for itself in 22 days

THIS IS ONE OF 6 Tennant Sweepers used at Caterpillar. The first was bought 3 years ago.

TENNANT

POWER SWEEPER

THIS fast, heavy-duty TENNANT Power Sweeper cost $1985*... yet saved enough in manhours at Caterpillar Tractor Co. (Peoria) to pay for itself in 22 days.

These results were obtained in the Parts Department, where 12 men formerly swept aisles with push brooms. The saving, confirmed by time studies, amounted to more than 80 manhours per day.

SWEEPS CLEAN AT HIGH SPEED as 36" brush spins inside "sealed-to-floor" compartment. 11" fan controls dust. Removable hopper.

CUTS COSTS IN MANY PLANTS

● **U.S. RUBBER** estimates mechanized sweeping can save up to $12,000 annually per machine. (They have 3 Tennant sweepers.)

● **PAN AMERICAN** Airlines save approximately 75% in manhours by sweeping their warehouse floors in Miami with a Tennant Model 36 Power Sweeper.

● **WHITIN MACHINE** report making a net saving of several thousands of dollars in 10 months with a Tennant Power Sweeper.

*Smaller models available.

LET US ESTIMATE savings possible in your plant through mechanized sweeping. No obligation. Phone, wire or write!

TURNS "ON A DIME." Easy-steering; easy to handle. Forward or reverse on single pedal.

G. H. TENNANT CO.
2534 North Second Street
Minneapolis 11, Minn.

TENNANT Established 1870

Write for illustrated bulletins and performance data; specify 36" or 24" sweepers. Also get FREE 16-page booklet, "New Ideas on Plant Sanitation & Maintenance."

INDUSTRIAL FLOOR MACHINES

CREATORS OF THE TENNANT SYSTEM OF FLOOR MAINTENANCE • MANUFACTURERS OF EQUIPMENT AND MATERIALS FOR MAINTENANCE OF FLOORS, DECKS, ROOFS, HIGHWAYS

OFFICES IN PRINCIPAL CITIES

Good Ways to Solve Special PLANT ENGINEERING PROBLEMS

Begins on page 276

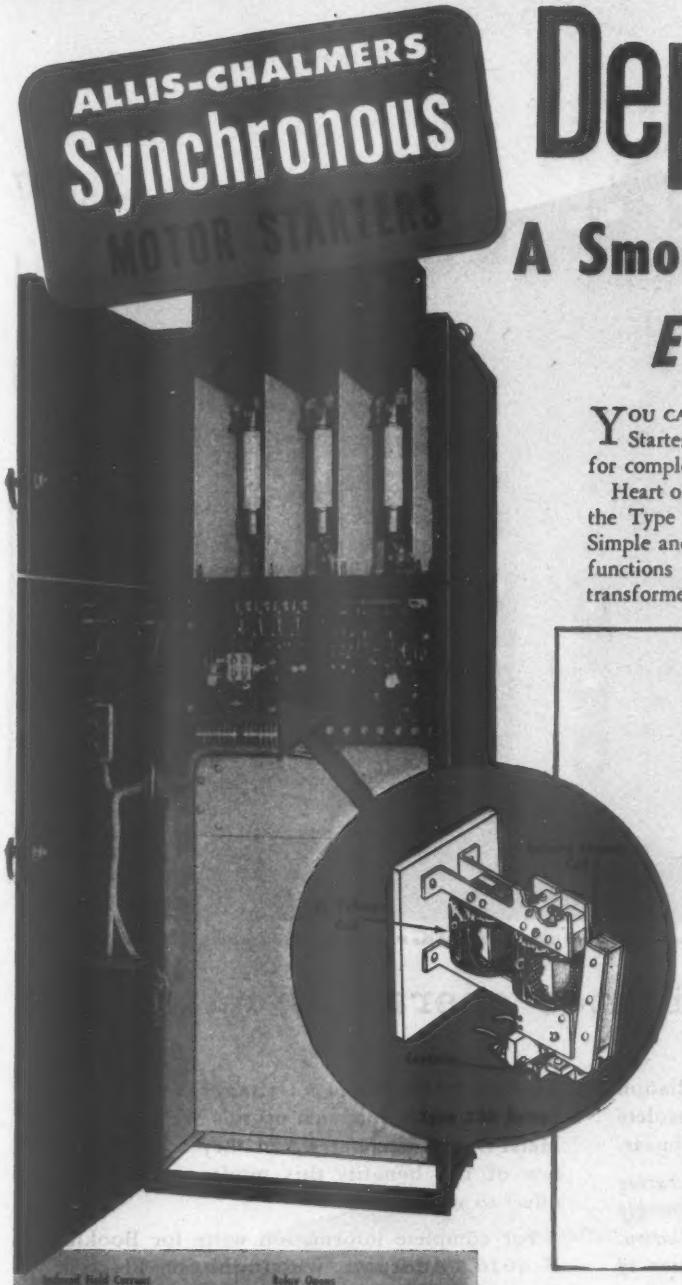
CAN'T PUT A PERMANENT CHIP GUARD ON THAT MACHINE? The Dilley Magnetic Grip-Shield may be your answer. Has Alnico base, two-way positioning arm, and plastic panel. *(To get descriptive bulletin, check No. 47 on coupon, page 330.)*

GOT A ROOF MAINTENANCE PROBLEM? Your roof may be drying out, eroded, or broken. Johns-Manville folder, Roof Savers, tells you what to do. *(To get it, check No. 48 on coupon, page 330.)*

HOW TO RECLAIM SOLIDS FROM WASTE WATER: Whether you want to recover usable material or avoid stream pollution, Link-Belt Company recommends its Model NRM liquid vibrating screens. Booklet No. 2377 tells how to select the right equipment. *(To get this booklet, check No. 49 on coupon, page 330.)*

HOW TO ERECT CORRUGATED SHEET AT LOW COST: You can do it by making all fastenings from topside with Topseal fasteners, says the Fabricated Products Co. Bulletin No. 512 also shows how it preassembles the fasteners with leakproof Weath-R-seal washers. *(To get this bulletin, check No. 50 on coupon, page 330.)*

ARE YOUR TRANSFORMER OR TURBINE OILS FAILING? You need to keep your dielectric or lubricating oils free of harmful contaminants. Bulletin 832-P by Bowser, Inc., illustrates built-in system for continuous conditioning of turbine oil, and portable equipment for reconditioning dielectric oils. (To get this bulletin, check No. 51 on coupon, page 330.)



Dependable..

A Smooth, Accurate Start

EVERY TIME!

YOU CAN DEPEND on Allis-Chalmers Synchronous Motor Starters for accurate and consistent field application . . . for complete line-to-load protection.

Heart of the Allis-Chalmers Synchronous Motor Starter is the Type 230 polarized field-frequency application relay. Simple and dependable, this single relay performs all these functions without the use of primary potential or current transformers:

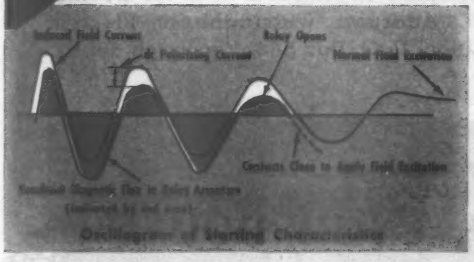
★ Applies dc excitation automatically when proper rotor speed is reached.

★ Selects exact half cycle and the most favorable angle between rotating field and revolving magnetic stator field to apply excitation.

★ If motor pulls out of step, it removes field excitation promptly at instant of pull-out.

★ Resynchronizes automatically after pull-out if condition has been corrected.

THIS IS HOW THE RELAY WORKS. The transformer action between the stator and the rotor of a synchronous motor (during acceleration) causes an alternating current to be induced in the field circuit of the rotor. A decrease in the magnitude and frequency of the induced rotor current as the motor accelerates, together with a biasing voltage from the excitation source, causes the Type 230 field application relay to apply field excitation at the most favorable point of stator-rotor relationship. The relay will maintain the field excitation during normal motor operation, but will operate to remove the excitation on motor pull-out. The relay will resynchronize the motor if the pull-out condition has been removed before protective devices operate to disconnect the motor from the line.



All Allis-Chalmers motor starters . . . those for synchronous, wound-rotor and squirrel-cage motors . . . give you everything you need for complete control and protection of your motors. The attractive, easy-to-install steel cubicles are compartmented to protect personnel — arranged for simplified maintenance. For more information, call your nearby A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 14B6410A.

A-3480

ALLIS-CHALMERS

There is an Allis-Chalmers Starter for Every Motor Need

Westinghouse Switchgear serves San Diego Marine Base

This 2400-volt Metal-Clad Switchgear installation serves power and lighting circuits at the Marine Corps San Diego Recruit Depot.

"...Its design eliminates operating hazards!"

This new Westinghouse Switchgear installation points up many advantages of replacing obsolete protective equipment with modern switchgear.

> *"... Because its design eliminates operating hazards, the new equipment provides a big margin of safety over the old installation. Safety interlocks and complete isolation of live parts make switching, circuit testing, and breaker exchange as safe as turning on the lights.*
>
> *"Lower over-all cost is anticipated also. Complete factory assembly and testing of the unit have resulted in substantially reduced installed cost ... and its standardized design provides ample flexibility for low-cost expansion or conversion of the depot's power system."*

This is how Ets-Hokin & Galvan, Electrical Contractors on this job, sum up this Westinghouse Metal-Clad Switchgear. And they cover only a few of the benefits this modern equipment offers to *you*.

For complete information write for Booklet B-4016. Address: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-60757

YOU CAN BE SURE...IF it's Westinghouse

METAL-CLAD SWITCHGEAR

What's unusual about U. S. Rubber's new plastic coating?

For one thing, this new coating, called *U.S. Royalguard Protective Coating*, has very high film flexibility and adhesion. It protects:

Against attack by splash, drip, and spray from corrosive chemicals:

- **Chemical Processing Equipment**
- **Tanks**
- **Pipes**
- **Tank Cars**
- **Fittings**

Against weathering and rust:

- **Structural Steel Parts**
- **Machinery**

U.S. ROYALGUARD plastic coating being applied to yarn-carrying wheels used by textile industry. It is air-drying...no baking or other special treatment is required to produce a tough, flexible, highly corrosion-resistant film.

SAMPLE PLATE coated with Royalguard is bent in vice to demonstrate its high film flexibility and high adhesion. It can be used on steel, aluminum, concrete, hardwood or composition board.

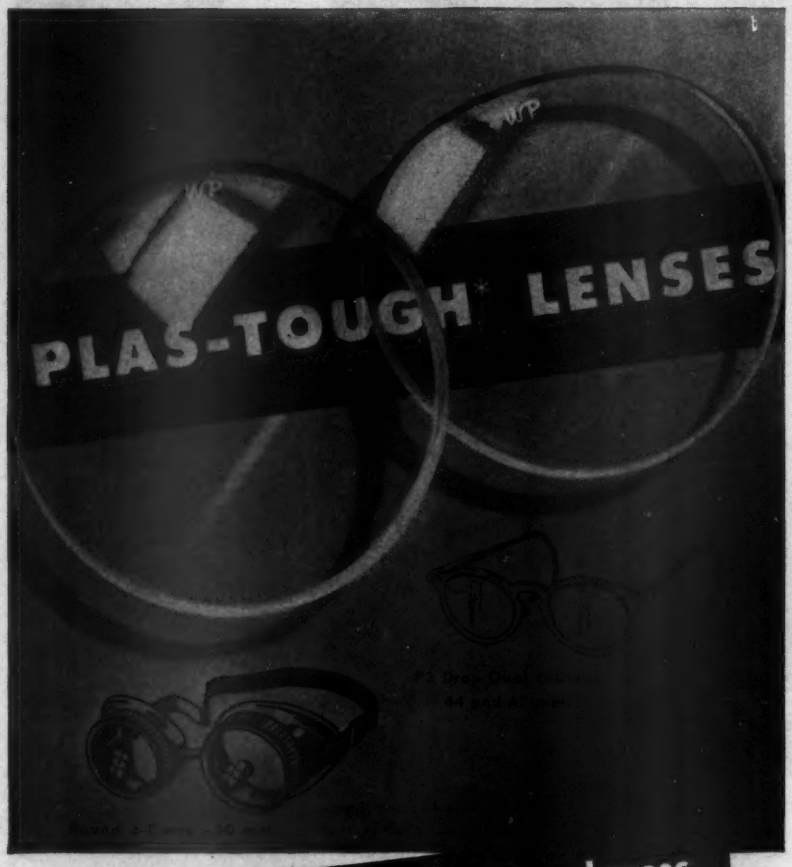
Royalguard is a one-coat system...no primer is required. It will find its broadest use in chemical processing, rayon and cellophane production, photo finishing, pulp and paper manufacturing, sewage disposal, filtering, electroplating and in mining. Write to address below.

PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

New WILLSON®



Only Half the Weight of Glass Lenses

- Newly developed, extra tough plastic
- Meets existing Federal Specifications for impact resistance and light transmission
- Improved surface hardness gives unusual resistance to pitting, scratches, abrasion and common industrial acids that mar ordinary plastics
- Light weight gives greater wearing comfort

*Trade-Mark

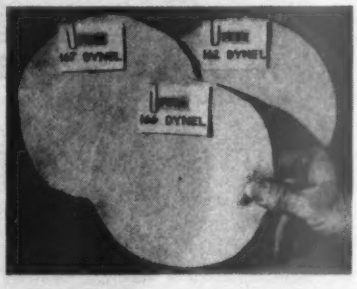
See your WILLSON distributor or write us direct
WILLSON PRODUCTS, Inc., 218 Washington St., Reading, Pennsylvania
Dependable Products Since 1870

NEW MATERIALS

Begins on page 284

A SPECIAL OIL for deep-hole drilling provides longer drill life, faster cutting rate, according to Conner Tool & Cutter Co., 1000 E. McNichols Rd., Detroit 3. Advantages claimed are uniform chip formation, superior chip-flushing, and effective cooling of tool and work.

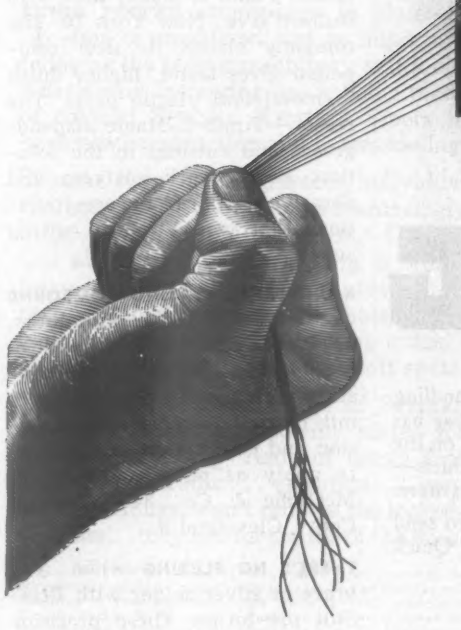
STUPALITH, a ceramic, can withstand extreme thermal shock. It does not expand or contract with temperature change. Samples heated to 2000 degrees F., then plunged into liquid air, stay intact. Stupalith can be formed by pressing, extruding, casting, and ramming. The Stupakoff Ceramic & Mfg. Co., Latrobe, Pa., recommends Stupalith for kiln furniture, high temperature jig forms, and plug-and-ring gages.



DYNEL FILTER CLOTHS permit a higher rate of flow than other synthetic fabrics, according to Filtration Engineers, Inc., 155 Oraton St., Newark 4, N. J. Cloths have a wide range of chemical resistance. They are resilient, so seal easily in press frames.

RUST-INHIBITING PAPER for heavy-duty packaging is being made by Nox-Rust Chemical Corp., 2429 S. Halsted St., Chicago. It's made of cemented kraft sheet reinforced with spun glass fibers. This combination provides a tough wrapper for packaging heavy machinery and bulky metal parts. Paper is impregnated with a volatile rust-inhibiting chemical.

Turn the page



Sinews of "Cordura" make a carpet stronger, lighter, and more flexible. The chain warp in carpets must be strong enough to bind the surface tufts firmly in place. Because "Cordura" is much stronger than natural fibers, a smaller-gauge yarn does the job . . . and ties a smaller, tighter knot around the tufts, at no extra cost.

More strength at no more cost with this Du Pont yarn

Small strong cords of Du Pont "Cordura"* High Tenacity Rayon can do the work of large cords of natural fibers. This means that when you use "Cordura" you can reduce the bulk of a strength section and also cut down on the amount of expensive carcass required. In many cases this not only holds down cost, but improves the product as well.

For example, "Cordura" makes conveyor belts thinner yet stronger, tires that are cooler running, V-belts smaller yet more efficient, high-pressure hoses lighter and safer.

Chances are that the extra strength of "Cordura" can help you improve a product or a process . . . without increasing cost. It may even help you bring a new product into production. We'll be glad to work with you.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

SEND FOR FREE BOOKLET "*Sinews for Industry.*" It gives physical properties of "Cordura" and tells how Du Pont will help you. Address: Rayon Division, Room 4421, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*Name*_____

*Company*_____

*Address*_____

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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

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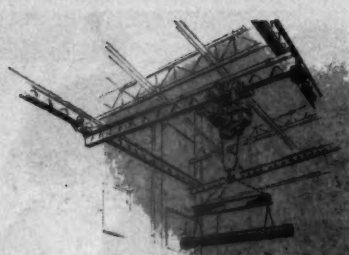
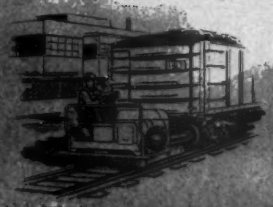
NYLON
ORLON* acrylic fiber
ACETATE RAYON
DACRON* polyester fiber
DU PONT TRADE MARKS

for fibers today . . . for fibers to come . . . look to Du Pont



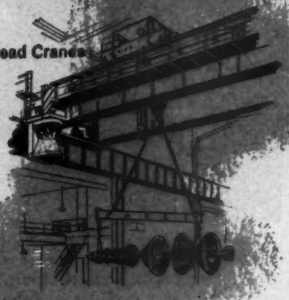
The Whiting Trackmobile



Whiting Trambeam Overhead Handling Systems

SAVE TIME, MONEY AND MANPOWER!

Whiting Overhead Cranes



Handle it with

WHITING

Whiting Electric Chain Hoists

The *right* equipment to do your specific handling job . . . that's *your* problem . . . and *Whiting* has the answer! Let Whiting help you decide on the *best* way to move or lift materials and products—the way that costs the least yet accomplishes more.

The first step to improved efficiency is to send for our new, interesting, 16-page book, "Quick Facts on Handling."

WHITING CORPORATION

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Sales Offices, Representatives and Distributors Throughout The World

SEND FOR THIS NEW BOOK!

WHITING

NEW MATERIALS

Begins on page 284

FOG-FREE GOGGLES, windows, and glass shields are possible with RA-12, an anti-fogging compound prepared by Regal Air Corp., 500 Fifth Ave., New York. You spray it on. One application is said to last up to 30 days.

TUMB-L-MAGIC is the key to more efficient wet-process tumbling, claims Tumb-L-Matic, Inc., 4510 Bullard Ave., New York 70. The company claims its new compound gives faster, higher finish to metal and plastic parts. The reason—Tumb-L-Magic suspends grease and cuttings in the solution, keeps work surfaces and abrasives free from accumulations that would retard cutting action.

A UNIVERSAL GLAZING COMPOUND can be applied to steel, aluminum, or wood sash without special preparation. Penco Dual-Glaze stays permanently elastic to permit normal temperature expansion and contraction. It's as easy to apply as putty, says W. S. McGuffie & Co., 3400 Theurer Court, Cleveland 9.

THERE'S NO FLUXING when you braze or silver solder with Pres-Sint pre-forms. These precision pre-forms bring their own flux right to the job. You can use PresSints with flame, atmosphere furnace, or induction heating. PresSint Products, Lyndhurst, Ohio.

LUCOFLEX—a new acid-resistant material—can be welded, machined, or formed into rigid sheets, tubes, bar stock, or molding powder. It's a non-plasticized polyvinyl chloride. It weighs half as much as aluminum, but has the same tensile strength. Lucoflex requires no industrial finish for protection against precipitation and fumes. Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland.

HERE'S WHY PERSONNEL MEN SAY:

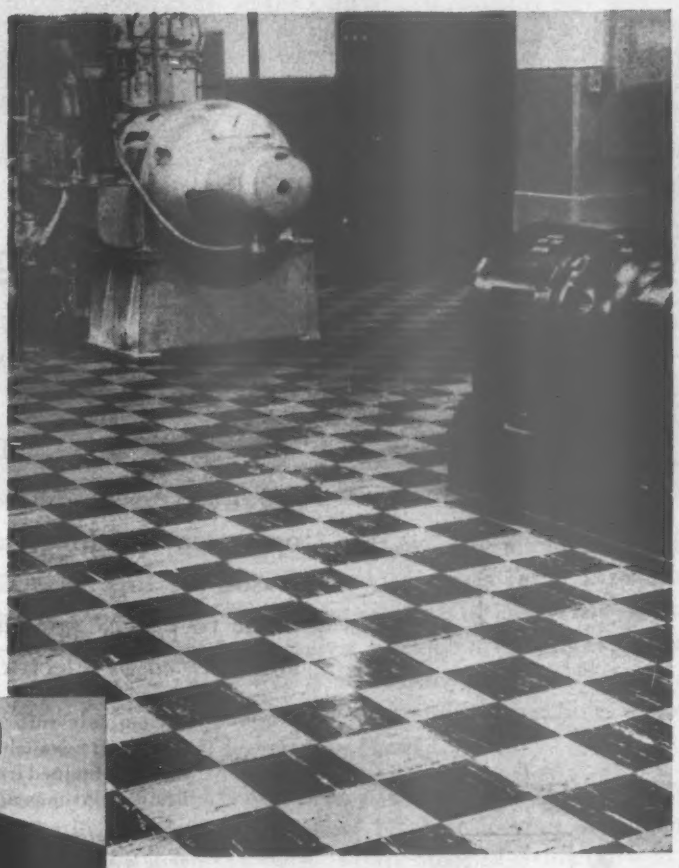
SPECIAL GREASE-PROOF KENTILE floors help build morale and increase efficiency

THE PROPER atmosphere in plant or shop is considered just as important today as the proper machinery and tools. That's why increasing use is being made of colorful SPECIAL KENTILE Floors in both new construction and in remodeling.

SPECIAL KENTILE is a durable, individual tile, heavy duty floor that costs amazingly little . . . about 40c per sq. ft.* Greases and oils spilled or tracked on it won't harm this super-sturdy material . . . petroleum oils and greases, alcohols, alkalis and most acid solutions wash up quickly and economically . . . leave no soft spots.

The lighter, brighter colors of SPECIAL KENTILE make them ideally suited for industrial flooring. Years of heavy foot and wheeled traffic . . . vibration . . . constant cleanings, won't remove the locked-in colors . . . they last for the life of the floor.

**Price for 1,000 sq. ft. of 1/8" thickness. Your cost may be considerably lower or slightly higher depending on the size and condition of your floor and freight rates. Consult your local Kentile Dealer for an exact estimate. His name is listed in the classified phone directory under* FLOORS. *In Canada—at T. Eaton Co., Ltd.*



KENBASE bridges the unsightly and dirt-catching gap where the floor meets the wall . . . reduces maintenance costs even more. Kenbase never needs painting . . . mop and scuff marks can't show.

SPECIAL GREASE-PROOF KENTILE®

KENTILE, INC., 58 Second Avenue, Brooklyn 15, New York • 350 Fifth Avenue, New York 1, N. Y. • 705 Architects Building, 17th and Sansom Streets, Philadelphia 3, Pennsylvania • 1211 NBC Building, Cleveland 14, Ohio • 225 Moore Street, S.E., Atlanta 2, Georgia • 2020 Walnut Street, Kansas City 8, Missouri • 1440 11th Street, Denver 4, Colorado • 4532 South Kolin Avenue, Chicago 32, Illinois • 1113 Vine Street, Houston 1, Texas • 4501 Santa Fe Avenue, Los Angeles 58, California • 95 Market St., Oakland 4, Calif. • 452 Statler Building, Boston 16, Mass.

why accept less?

CERTIFIED BALLASTS

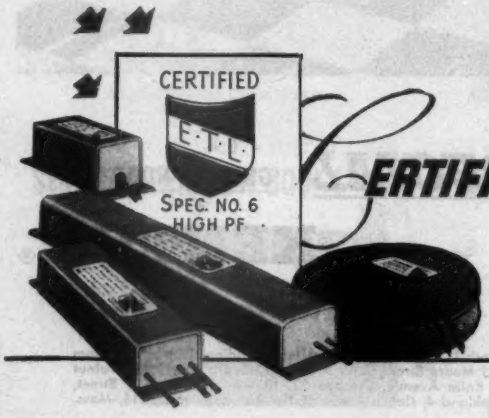
assure a full 100% life for fluorescent tubes!

Tests show that fluorescent lamps last longer when used with a CERTIFIED BALLAST than when connected with an improperly designed ballast.

CERTIFIED BALLASTS assure rated light output, quiet operation and long, satisfactory service. There's a reason for this. It is... CERTIFIED BALLASTS are made to precise specifications, then tested, checked and *certified* by Electrical Testing Laboratories, Inc.

● Complete information on the types of CERTIFIED BALLASTS available from each participating manufacturer may be obtained from Electrical Testing Laboratories, Inc., East End Avenue at 79th Street, New York, New York.

Participation in the CERTIFIED BALLAST program is open to any manufacturer who complies with the requirements of CERTIFIED BALLAST MANUFACTURERS.



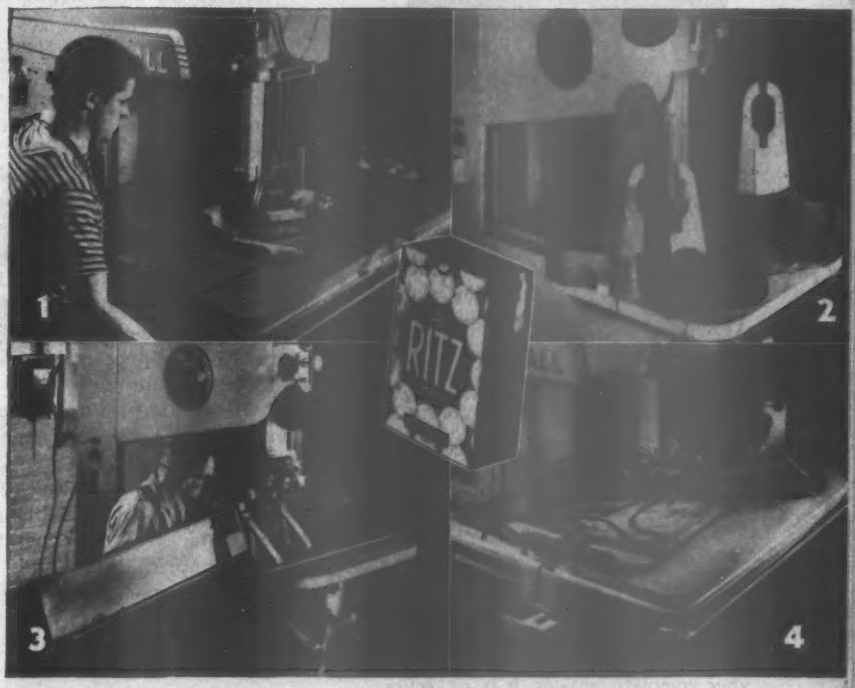
CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO

HOW A CRACKER BAKER BENEFITS FROM DoALL BAND MACHINING

DOES WORK FASTER; CUTS ALL KINDS OF SHAPES; MACHINES BRASS, BRONZE, ALUMINUM, CAST IRON, STAINLESS, HARD TOOL STEEL; GETS FINER, MORE ACCURATE CUTS



1. **Circular parts cut automatically using disc cutting attachment and hydraulic power feed.**
2. **Sheet steel parts for packaging machinery produced quicker by friction sawing.**
3. **Friction sawing steel channel on DoALL Zephyr Band Machine.**
4. **Contour sawing irregular shapes from solid steel 2" thick by 14" square.**

AT National Biscuit Company's machine shop in Evanston, Illinois, DoALL Band Machines really earn their keep. They work all the time on all kinds of jobs. They cut any material—even the hardest steel. One job originally calculated to take a week's time was done in three days on the DoALL MP-20. Other work formerly done on milling machines is now done much faster at less cost on DoALL's.

You can have benefits like these. Ask to have a FREE DEMONSTRATION of a DoALL Band Machine in your own plant. Call your local DoALL Sales-Service Store or write:

THE DoALL COMPANY • 254 N. Laurel Ave. • Des Plaines, Illinois

SEND FOR CATALOG

...arn about jobs that DoALL ...nd Machining can do for ...u. Find out about blades for ...tting every material; how ...u can saw, grind, bone, ...olish, friction saw — cut ...y shape. Write today.

8-2

INDUSTRY'S NEW TOOLS

DoALL

27 SALES-SERVICE STORES

Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies

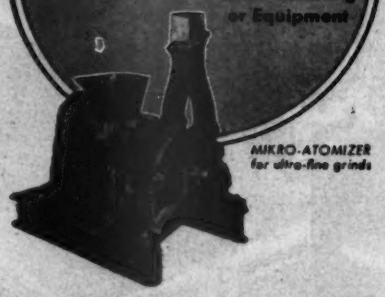
SAVE AND SIMPLIFY

-by this Process of ELIMINATION and REDUCTION

The MIKRO-ATOMIZER

ELIMINATES: Air Separator • Bucket Elevator • Screw Conveyor

REDUCES: Headroom • Floor Space • Extra Handling or Equipment



MIKRO-ATOMIZER for ultra-fine grinds

If your need is for ultra-fine grinds requiring air classification rather than screening, the MIKRO-ATOMIZER is your complete answer. It is an entire system producing perfectly blended grinds in the lower micron range in a single pass at exceptionally low temperature rises.

With its built-in air separator, it is a 3-function machine, grinding, air-classifying and conveying in one operation. Slight adjustments permit varying degrees of fineness. If necessary you can actually produce two degrees of fineness in one operation.

If you have ultra-fine grinding problems don't fail to investigate this 3-function MIKRO.

SEND FOR—
special MIKRO-ATOMIZER bulletin

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PULVERIZING MACHINERY COMPANY
24 Chatham Road Summit, New Jersey

MIKRO-PULVERIZER
MIKRO-ATOMIZER
Also Makers of the MIKRO COLLECTOR

LETTERS TO THE EDITOR

Why Not an Idea-Reporter?

Dear Editor:

. . . Your fine August editorial, "Why Not an Idea-Reporter in Your Plant," is one of the best suggestions I have ever read.

Suggestion committees are usually made up of people who do not know the department or the operation for which the idea is intended. Many good ideas are rejected from lack of understanding of the whole objective.

To recognize all good ideas and to treat them well is something few men are capable of. That's where the "idea-reporter" would fit in. He would be in a position to serve the employees and the staff. He would also be in a position to have both staff and the employees serve him.

It's not the cash award or the savings bond that will bring in the most ideas. It is recognition, honest appreciation and the feeling of importance that will bring them in.

Any man who can instill that feeling of belonging in the employee will get ideas and also repeats. Employees not only want that feeling of importance, they crave it. If the "idea reporter" can supply that feeling, he will find the employee's mind, stretched to new ideas, never goes back to its original dimensions.

I'd like to see the "idea-reporter" generally adopted. Why not start a column called "The Idea Reporter"?

A. E. SALMONS
GRINDING ENGINEER
DIXON VALVE & COUPLING COMPANY
PHILADELPHIA

•

Dear Mr. Waddell:

. . . In 1911 I was working at the Pullman Company as an ordinary laborer. The Barth & Taylor efficiency engineers were in the plant at that time, and out of a clear sky I got a request: "Come to the office." This is what they said:

"Young man, you have been selected to go from department to department and see what you can find in the line of ideas for better, more efficient work operations."

Well, plain me — a laborer — how come I was selected? I never did find out, but it may have been because I had written an article for the company magazine and I was interested in safety. So I went on the job. There was no increase in hourly rate. I think I was getting about 23¢ to 26¢ an hour and worked from 7 a.m. to 5:30 p.m., with three-quarters of an hour for lunch. However, one thing was granted me. I did not have to punch the time clock.

Now picture 1911, if you can. The boss was next to God, and the laborer was just a hand. It was not an easy job. At first the boys were all against it. They called me "that so-and-so." The men thought I was a snooper. But I thought the request was fair. I did not have a private secretary or a plush-carpeted office. I continued to carry my dinner pail and pint bottle of coffee.

The job was to be done in about two months. And after having been in only two departments the first month, I was scared stiff to speak to the "big boss." If in a month I could hardly complete two departments, how could I complete some 40 departments in two months? Then I got a surprise.

The boss said: "Nydam, you have turned in 383 reports, all of them good. Tell us how you did it and what you suggest we do to complete the job."

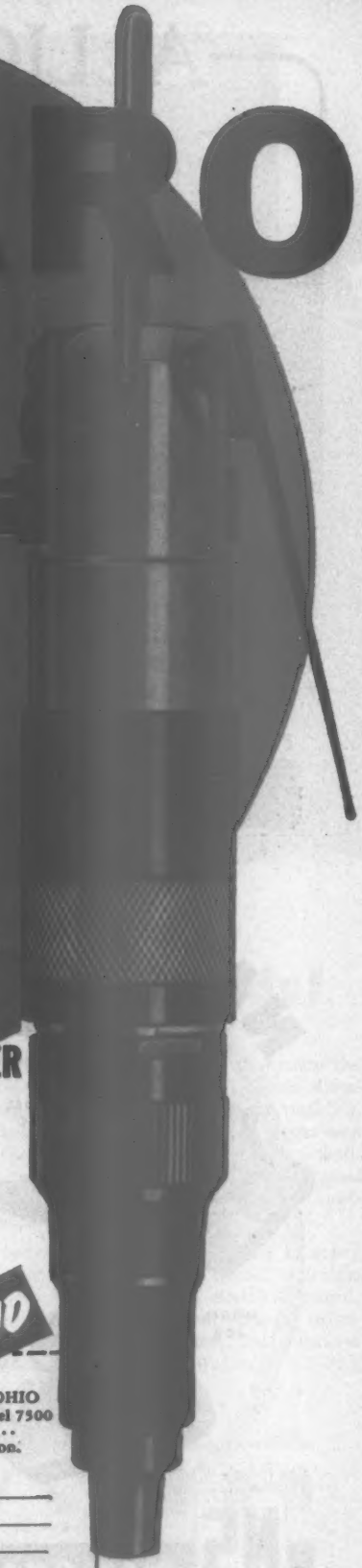
I told them plenty of my problems—how I had to gain the foremen's goodwill, and the goodwill

New!

NOBODY BUT ARO

OFFERS YOU

Instant PUSH-BUTTON Reverse



Actual Size

A REVOLUTIONARY SCREW DRIVER and NUT SETTER

ARO's new push-button valve means *instant reverse action* . . . no need to remove from work . . . no stopping to turn levers . . . no wasted time.

Adjustable clutch (available with positive clutch). Length 7-11/16" . . . outside diameter 1-5/16" . . . weight 1.4 lb.

This outstanding tool must be seen in action to appreciate its amazing action. We will be glad to arrange an on-the-job demonstration.

SEND

ARO

AIR TOOLS

Also . . . LUBRICATING EQUIPMENT . . . HYDRAULIC EQUIPMENT . . . AIRCRAFT PRODUCTS . . . GREASE FITTINGS

THE ARO EQUIPMENT CORPORATION, BRYAN, OHIO

I am interested in learning more about the new ARO Model 7500 Screw Driver and Nut Setter with *push-button reverse action* . . .

☐ Please arrange an on-the-job demonstration. No obligation.

☐ Please send literature.

Name_____

Company_____

Street_____

City_____ State_____

ALLIGATOR
CONVEYOR BELT LACING

In Long Continuous Lengths for Conveyor Belts . . .

- ★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
- ★ In canneries where corrosion or rust is a problem specify Alligator made of Monel.
- ★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
- ★ Separable and smooth on both sides.
- ★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width.*

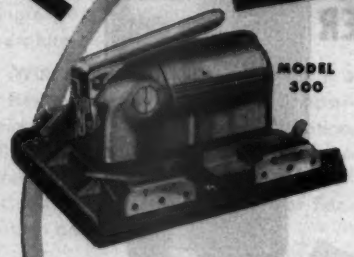
Order from Your Supply House. Ask for Bulletin A-60

FLEXIBLE STEEL LACING CO., 4678 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT

NATIONAL SANDERS

Orbital or Straight-Line Action



National high-speed, block sanders are designed to cut your finishing costs. Whether your product is best adapted to orbital or straight-line action . . . whether you need a wet or dry sander . . . whether you're sanding a large flat surface or contours and curves, National can help speed production. See your distributor today, or write the factory for details.

The right sander for every finishing operation!

NATIONAL NS SANDERS

NATIONAL AIR SANDER, INC.
2816 AUBURN STREET, ROCKFORD, ILLINOIS

LETTERS . . .

Begins on page 290

of fellow laborers. I started out this way—by being honest and above board. I made all my reports in quadruplicate: (1) for the man who gave me the idea, (2) for the foreman, so he would know what I was sending in, (3) for the man I called "the big boss," and (4) for my own record.

The first week was tough. But the foremen then saw the possibilities and paved the way a little for me. The laborer, instead of calling me a snooper, started to say, "Tell Bill. He'll treat you right."

The big boss backed me where anything was very much out of order by immediately correcting things.

I made all my notes during the day and wrote my reports at home at night. I'd review them with the fellows the next day and make some small changes where necessary. I know I really had their goodwill.

So I suggested this: "Three more laborers—I'll give you the names. Give them the same privilege of not having to punch the time card. But keep them out of the plush-carpeted offices. Let each man be one of the men. The foreman should be told in advance so we little fellows don't have to fight against the little gods. Then I think we can take care of our fellow workers. For once they know we do the thing fair, they will help."

The result was that there were four men, and what began as a one-man job for a month's time turned out to be a job for four plain grammar school graduates. And the job lasted over a year.

After that I started to work in the general office. The other lads went to the engineering department. The whole scheme worked very well.

WM. J. NYDAM
EMPLOYMENT MANAGER
CONGOLEUM-NAIRN INCORPORATED
KEARNY, N. J.

Turn the page

No. 304-N Sylphon Packless Valve. Sizes from ½" to 2" for pressures up to 150 pounds. Larger sizes available. For vacuum service, No. 304-NV is ideal.

Valve with a leak-proof heart —saves your gases and liquids!

PICTURED HERE is one of the many exacting tests Sylphon Packless Valves must pass, to make sure they're leak-proof. For when they're installed on pipe lines carrying gas, oil or other volatile liquids or vapors, it's their job to prevent even tiniest leaks—in or out!

You can see the savings that makes—in preventing waste, in providing vacuum protection. And Sylphon Packless Valves give you *safety* features, too. They help guard you and your equipment against dangers of hazardous liquids or gases . . . are extra protection against explosion, fire and other damage.

It's the "heart" of the valve that turns the trick—the rugged, seamless Sylphon metal bellows that replaces customary packing. The bellows eliminates leaks that might seep past the stuffing box of even the best packed-type valve. It seals the valve stem against corrosive, dangerous or inflammable liquids or gases.

Sylphon Packless Valves come in many sizes and types—in brass, monel, stainless steel, etc. Widely used in chemical plants, oil refineries, power plants, aboard ships. Ideal as standard equipment. For complete information, write for Bulletin TF-813.

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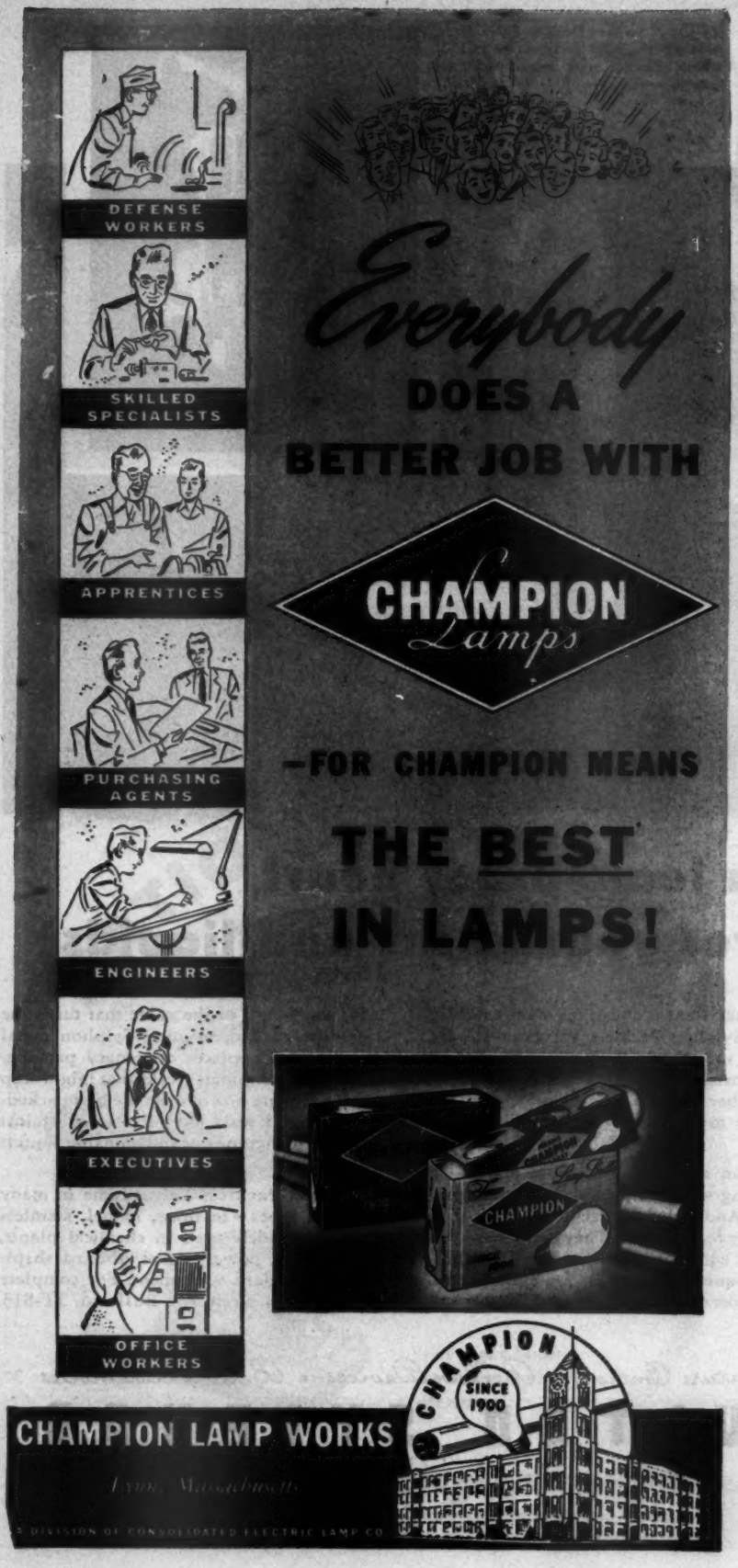

LETTERS...

Begins on page 290

A Sterilized CMP?

Dear Editor:

. . . Your report in August FACTORY (page W-3) seems to accept CMP as the only possible, practical, or available plan for the control of scarce materials in an emergency.

If that were so, the sterilizing procedure you propose would bring about at least two results:

1. It would leave CMP in possession of the field more completely than the end of World War II left it. It would perpetuate a basic plan that was only partially effective during World War II and certainly has not been satisfactory in its revised 1950-51 pattern.

2. It would give bureaucratic Washington, during non-emergency periods, another club over business on the one flank where business must have complete freedom of action. Without that freedom, business cannot continue to support the nation's economic structure and high standard of living and still carry today's terrific and steadily mounting tax burden.

After all, even the most enthusiastic proponents of CMP have admitted that it leaves much to be desired. They defend its revival in the mobilization program on the ground that it met with relatively little criticism after its first six months during World War II.

They fail to recall that American industry had already struggled along with the Government in trying to make two other priority plans work, before CMP was hatched. Then we were in the war, and it might have seemed unpatriotic for anyone to have urged a change of "control horses" in midstream.

Today we are in a somewhat similar position. Application of the revived CMP has aroused no end of dissatisfaction and confu-

Bring them down with these DAYTON Cog-Belt* "teeth"

- 40% more h.p. per belt
- fewer belts
- fewer pulley grooves
- longer belt life

Switch to premium Dayton Cog-Belts and watch the cost of power transmission come tumbling down. Original cost is less. 5 Dayton Cog-Belts do the work of 7 ordinary V-Belts.

You save drive space. Cog-Belts let you use up to 25% shorter center-to-center pulley distances.

Cogs are the *only* V-Belts scientifically built to bend, like your finger. They withstand flexing and compression strains better, run cooler, last longer.

To get shut of V-Belt troubles for the duration, to save money and drive space, give your Dayton Distributor the "high-sign" of better V-Belt power transmission: the arched finger that means Dayton Cog-Belts and important savings!

COGS FIX FLATS!

Dayton Cog-Belts converted a compressor drive in a railroad shop, from a flat drive that averaged 6 breakdowns a year, to a trouble-free V-flat drive now going into its tenth year of service. Cogs need no special pulleys, grip so well they convert flat to V-flat with only one pulley change!

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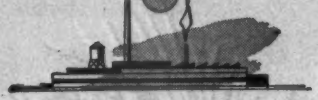
V-Belts by Dayton Rubber

*T.M.

WORLD'S LARGEST MANUFACTURER OF V-BELTS

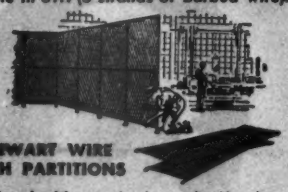
YOU SAFEGUARD YOUR VALUABLES

WHY NOT YOUR PLANT



Unfenced property invites vandalism and sabotage. Don't take chances in these dangerous days. Fence NOW and be safe. Surround your property with a Stewart Non-Climbable Chain Link Wire Fence. Also available for protective measures are Stewart Wire Window Guards, Steel Folding Gates, Wire Mesh Partitions and other products. Catalog No. 85, which contains complete information, will be sent on request.

Stewart 3TH Chain Link Wire Fence. Also available in 5TH (5 strands of barbed wire).



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Sectional with standard panels. May be arranged to fit any space. Ideal for locker rooms, toolrooms, storage rooms.

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1856 Stewart Block, Cincinnati 1, Ohio
"Fence Builders to America Since 1886"

Stewart IRON and WIRE FENCES

LETTERS...

Begins on page 290

sion in many quarters, even though the control "shoe" has hardly begun to "pinch." However, we are still far away from the pressures of those rigid controls that we learned to bear during World War II.

We are not so completely steeped in the CMP pattern that a carefully planned change could possibly bring serious consequences. Therefore, would it not be the better part of wisdom to have an improved plan thoroughly digested and ready for speedy enactment, before a *real* emergency.

I have just had a book published privately which outlines a materials control plan I call "Time-Locked Priorities."

The outstanding feature of this plan is that it leaves the basic control function firmly vested in the same men of American industry who, under inefficient controls, managed to make and distribute what it took in materials, munitions, and food to win the greatest mechanized war in history, and then, without government controls, give the country the most prosperous five "peace" years on record.

Industry's management would do the "controlling," see that mobilization production gets what it needs, and distribute what's left so that the rest of our economy can effectively support any mobilization demands. Government's job would be to see that the control laws is observed.

I shall be happy to send a copy of the book to any of your readers who are interested.

ARTHUR I. APPLETON
PRESIDENT AND TREASURER
APPLETON ELECTRIC COMPANY
CHICAGO, ILL.

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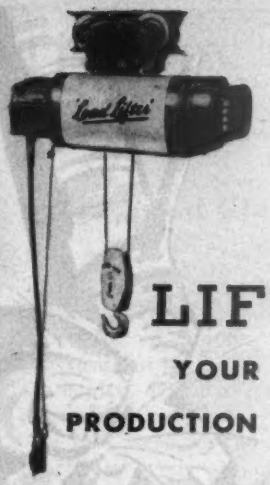
Dear Editor:

. . . The biggest problem in re-establishment of the Controlled Materials Plan is in manning government agencies to handle it. It was my guess that some 5000 to 6000 people would be needed



LIFTS YOUR PRODUCTION CURVE

'Round-the-clock, shift-to-shift, this rugged "Series 700" 'Load Lifter' Electric Hoist works wonders in boosting defense and civilian output. Wherever tough lifting jobs raise costs and hinder production, you need this fast-acting, effort-saving hoist.

Stamina and speed are built into every 'Load Lifter'. Heat-treated helical gears, steel suspension, powerful synchronized load and motor brakes — all guarantee reliable performance and complete safety on the toughest jobs. Ball bearings combine high efficiency with smooth operation. The 1,000-lb. size 'Load Lifter' can lift its load one foot per second. With convenient one-hand push-button control, the operator has the other hand free to guide the load. Only 24 volts at the push-button for extra safety.

The 'Load Lifter' is of simple design throughout — keeps maintenance and operating costs at a minimum. It can be serviced in the air. Let the 'Load Lifter' raise your production curve to new high levels! Your distributor has all the facts about this pace-setting electric hoist. Write for Bulletin No. 399.

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Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, and 'American' Industrial Instruments.

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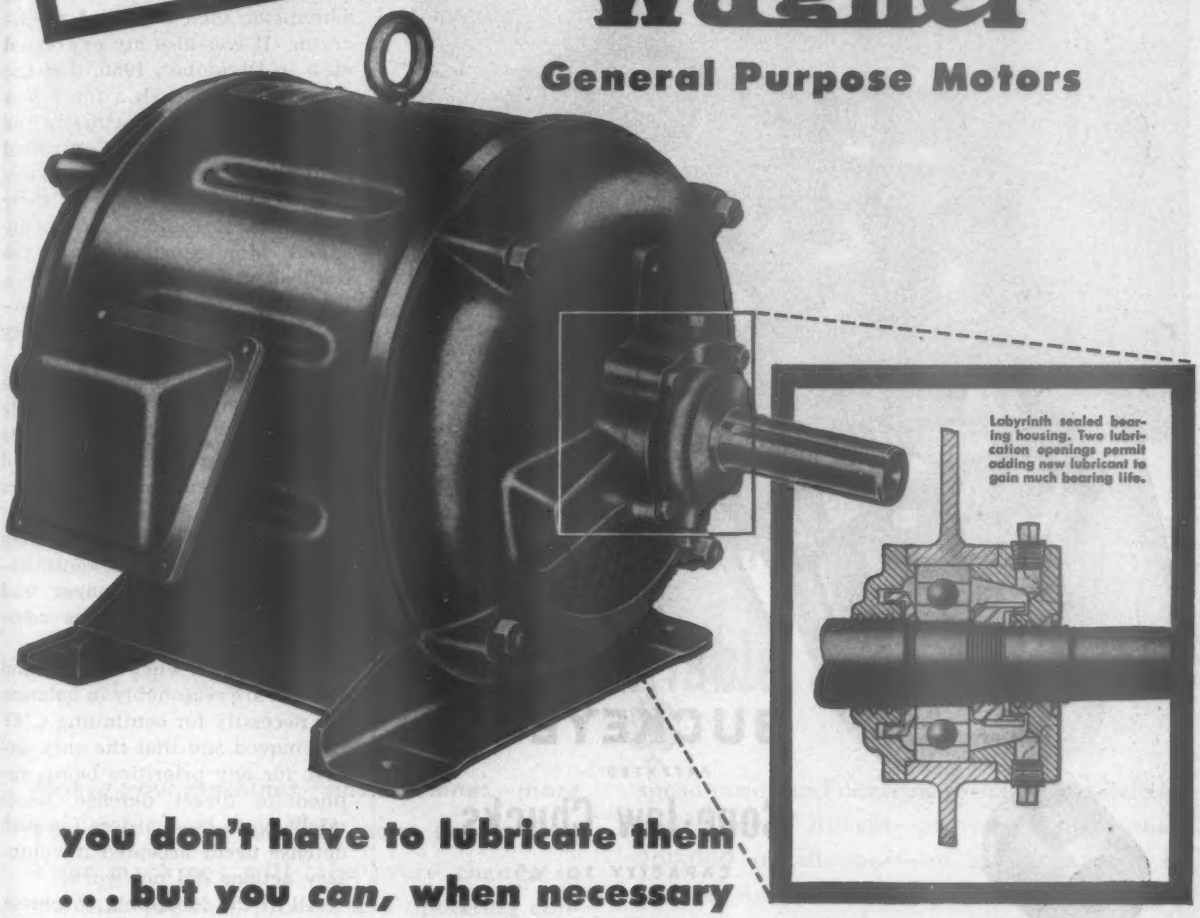

you don't have to lubricate them ... but you *can*, when necessary

Wagner Steel-Frame Motors have been *proved*—durable, dependable and trouble-free by more than twenty years of hard usage in industry after industry. They have a reputation for long, useful life. Among the many engineering features that have built this reputation is the ample sized, sealed, bearing housing.

Wagner bearing housings are effectively sealed against the entrance of dirt or grit that cause rapid wear. You don't have to lubricate the bearings (motors in the smaller frame sizes will often operate for the life of the unit without lubrication) but, Wagner Motors are provided with two lubrication openings—you *can* lubricate them, to add much useful motor life where the motors are used in tough applications.

Wagner's new Bulletin MU-131 gives full information on the proper lubrication of electric motors—write for your copy. Thirty-one branches, located in principal cities, are ready to assist you whenever you have a motor problem. Consult the nearest branch, or write us.

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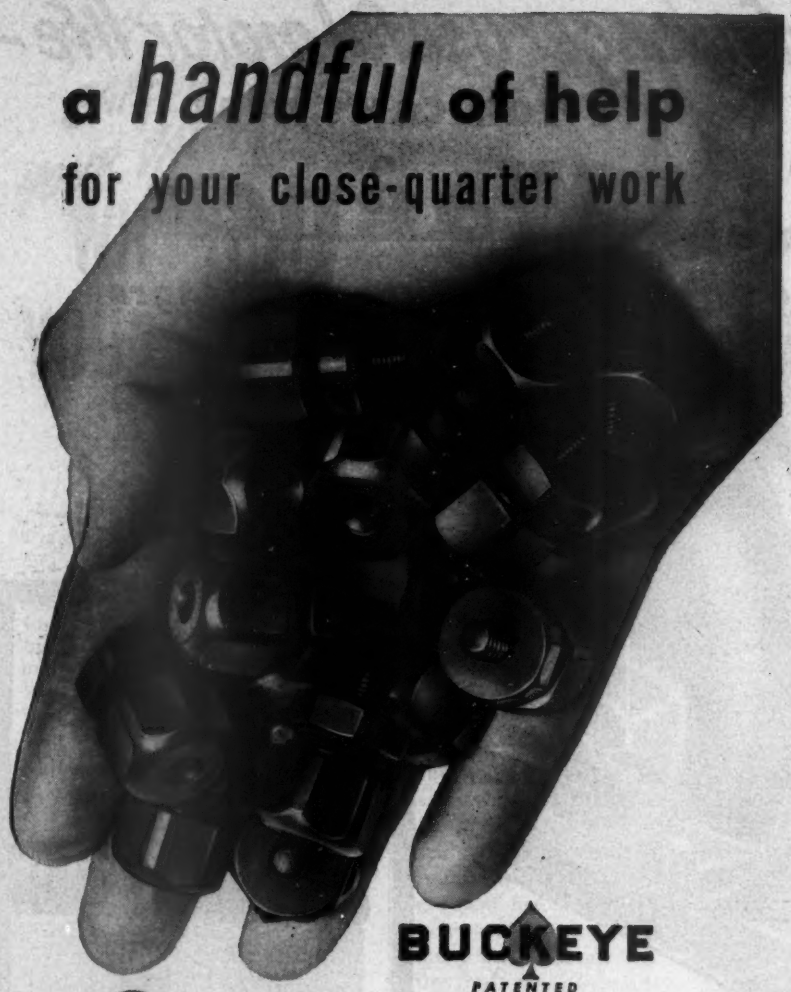

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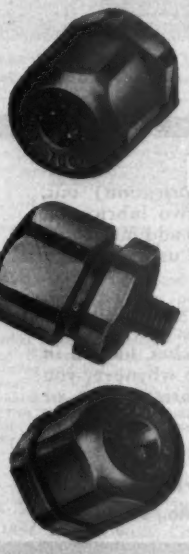
CAPACITY TO ¼"



A small chuck—just 13/16" O.D.—designed to do a big job, especially when tool space is limited. Low in first cost, lower still in maintenance—jaws are easily replaced in one minute without using any tools. Rolling action of cone jaws as chuck is tightened presents a new face to tool shank each time, reducing jaw wear, and pulls shank firmly into recess in chuck, insuring true alignment. For use with all Buckeye 30°, 90°, 360° adjustable, angle head tools—easily adapted to other makes. Thousands of Buckeye Cone-Jaw Chucks are saving time and money in hundreds of plants today—how about yours?

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CORPORATION
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Portable Air and Electric Tools for Industry

LETTERS...

Begins on page 290

in NPA-DPA in Washington to administer such a control mechanism. It was also my expressed view in December, 1950, that the organization of such a force was one of the limiting factors in the establishment of the Controlled Materials Plan. I further believe that CMP regulations in their present form would be admirably suited, after a cessation of the Controlled Materials Plan for a period of time (hopefully forever), for reactivation with very little modification.

Since the establishment of the force of 5000 to 6000 people needed in NPA-DPA to handle the Controlled Materials Plan and other required control orders would be the controlling factor, I question whether anything would be gained by the continuation of the flow of paper and authorizations, as well as compliance, etc., that you suggest.

I think that when supply and demand are reasonably in balance, the necessity for continuing CMP is removed and that the only excuse for any priorities being applied to direct defense needs might be to have orders for such defense needs accepted if voluntary actions did not work.

All of the foregoing, of course, is contingent upon whether the Defense Production Act would be continued. If the Defense Production Act was eliminated or modified and if funds were not appropriated for the operation of agencies like NPA-DPA, the Controlled Materials Plan could not be used.

This provides my *personal* views and cannot necessarily be expressed as an official view of the National Production Authority or the Defense Production Administration. . . .

WALTER C. SKUCE
ASSISTANT ADMINISTRATOR FOR PRODUCTION CONTROLS
NATIONAL PRODUCTION AUTHORITY
WASHINGTON, D. C.

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REEVES Variable Speed Control

Makes your machines—any machines—more versatile! more useful! more productive!

Your machines will take every change in material, product, process and operating condition in stride . . . turn out more kinds of work, better work and more profitable work . . . when equipped with accurate, positive, flexible REEVES Variable Speed Control. REEVES offers a complete line, including designs, sizes, capacities, speed ratios and controls for every specialized need. Install REEVES—proved in more than 260,000 installations—on machines now in service. Ask for it on the new machines you buy. Let a REEVES engineer examine your speed control problem—no obligation, of course. Send for complete, 132-page catalog No. F57-G

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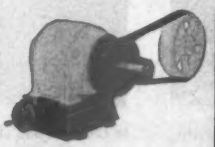
The 3 basic REEVES units

VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Sizes—fractional to 87 hp.



VARI-SPEED MOTOR PULLEY provides an instantly variable speed drive within 4:1 ratio for any constant speed motor. Sizes to 10 hp.

MOTODRIVE combines motor, speed varying mechanism and reduction gears in a single unit. Speed variations 2:1 to 6:1 inclusive. Sizes up to 20 hp. (Also available in fractional hp sizes with speed variations to 10:1.)

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HOW TO PROTECT A WIZARD'S MAGIC POWERS

The wizardry of electronic accounting is helping production men all over America to meet tremendous production goals. And guarding these miracle-working machines you frequently see a Frigidaire Dehumidifier.

For excessive moisture means problems...it can cause cards to curl and fit improperly in accounting machines —and can corrode electrical contacts. And even though tests are made before each run, a failure is a costly source of lost time.

To solve these problems a Frigidaire Dehumidifier is simply plugged into any standard electric outlet in the room where the machines are operated — to provide a quick and inexpensive way for removing harmful moisture from the air.

Whatever your own plant's air conditioning or refrigeration needs are, you can meet them quickly, and at low cost, with Frigidaire equipment. When the "heat is on"—Frigidaire can help take the heat and humidity off!

So for any refrigeration or air conditioning problem, call your Frigidaire Dealer, Distributor or Factory Branch. Look for the name in Yellow Pages of phone book. Or write Frigidaire Division of General Motors, Dayton 1, Ohio. In Canada, Leaside (Toronto 17), Ontario. And be sure to get Frigidaire's free Refrigeration Security Analysis of your present refrigeration costs and future needs.

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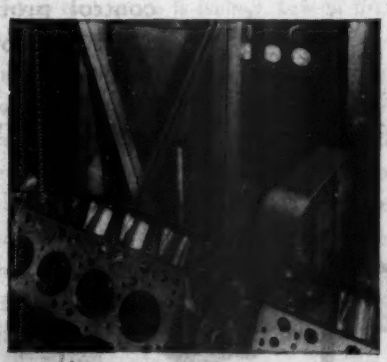
Over 400 Refrigeration and Air Conditioning Products for Offices Laboratories • Processing • Precision Assembly • Storage • Plant Lunchrooms • Medical Departments • Water and Liquid Cooling

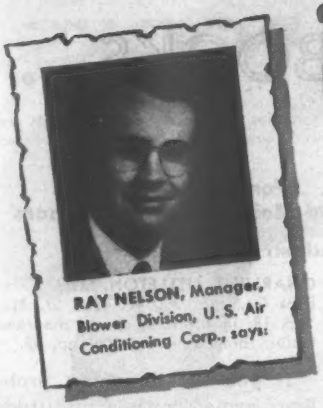
Frigidaire reserves the right to change specifications, or discontinue models, without notice.

In plants everywhere, it is being proved that more and better work can be produced — as in the drafting room above—when employees are kept comfortable with Frigidaire Self-Contained Air Conditioners. These units can be installed quickly and easily without use of ducts or interruption to work schedules.



Multiple cylinder boring and honing is accomplished at high speeds, and with complete accuracy, when a refrigerated coolant fluid bathes the surface being finished. Here a Frigidaire 7½ hp compressor holds coolant at 68° F. — an installation typical of many used in precision machining operations.

In factories and offices, Frigidaire water cooling equipment means increased employee efficiency, good will and good health. Frigidaire's wide range of types and systems includes bottle- and pressure-type coolers, industrial coolers, and tank-type coolers for use with remote compressors. *Advt.*



RAY NELSON, Manager, Blower Division, U. S. Air Conditioning Corp., says:

Durkee-Atwood V-Belts solved our Vibration problem

"In designing our Type CH Ventilating Sets, we found heavy vibration in test models . . . and traced the trouble to the short-center V-drive. When we called in Durkee-Atwood engineers, they showed us that the vibration was caused by the multiple belts. Durkee-Atwood solved this problem by vibration-testing their standard belts on their special equipment to meet our requirements. These belts, perfectly matched and with uniform cross sections, completely eliminated vibration. They run so true that *we have not had a single complaint from the field* on the performance of this ventilating set."

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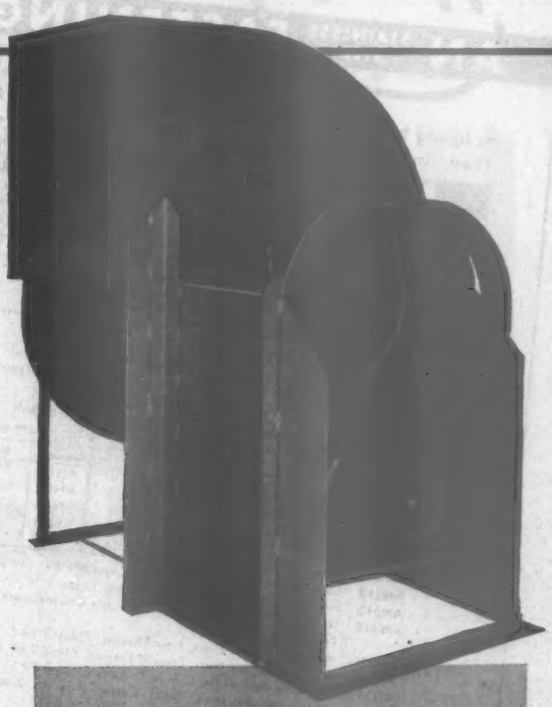
Vibration from mis-matched V-belts isn't confined to ventilating sets alone! It can make trouble in *all* your V-drive plant equipment . . . cause lower production, more maintenance time, increased belt replacement costs. So give Durkee-Atwood a chance to help!

Durkee-Atwood is a medium-sized company, so we can give exacting attention to every belt order. With our special testing equipment, we assure absolute matching of multiple belts . . . make sure that cross sections are perfectly uniform. This means *vibration-free* transmission for you . . . increased production and longer lasting service for your plant machinery.

Our moderate size permits fluid production, too—special work and emergency orders. Yet D-A's six modern plants and up-to-date equipment can handle your biggest orders.

If your plant has a defense contract, then you'll like Durkee-Atwood service . . . whether a simple belt replacement or help in designing a new drive set-up. Every D-A distributor is hand-picked to deliver the right-sized belts—*when you want them*—from the complete stocks of a full line. Or if you have a special design or production problem, experienced D-A engineers will help you work it out.

In our 30 years in business, we have established a record for quality V-belts. That is why we can guarantee the life of every Durkee-Atwood V-Belt! Write for complete details—or ask your nearest Durkee-Atwood distributor.



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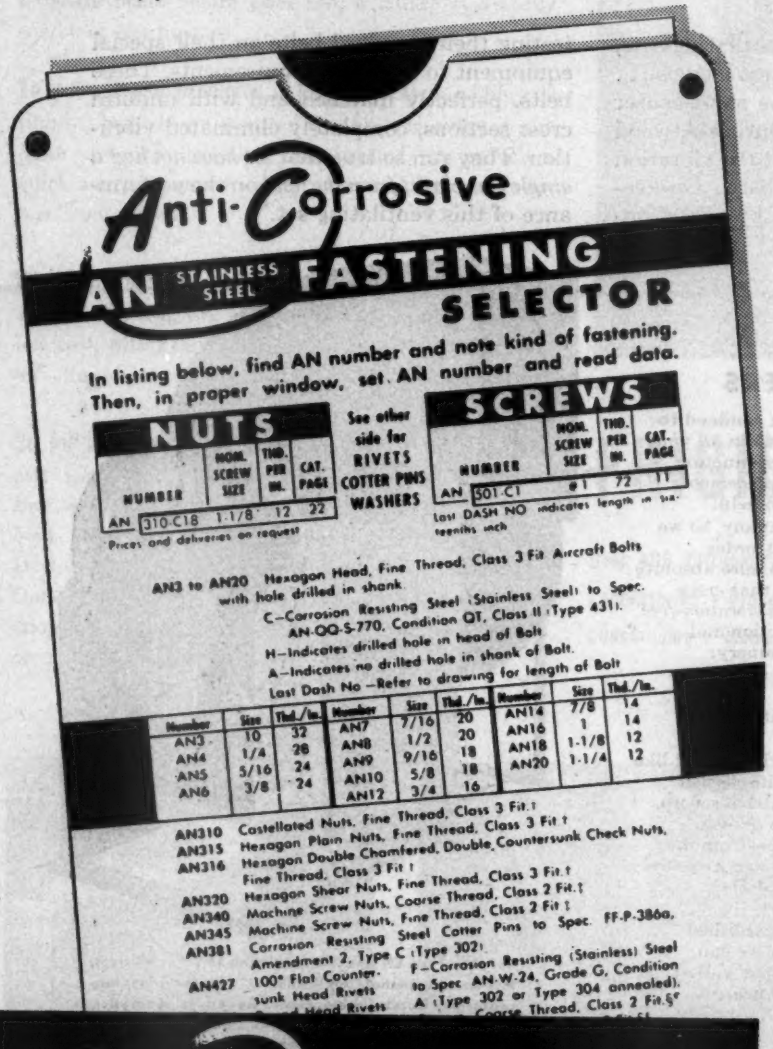
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AN STAINLESS STEEL FASTENING SELECTOR
In listing below, find AN number and note kind of fastening. Then, in proper window, set AN number and read data.
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NUMBER
NOM. SCREW SIZE
THD. PER IN.
CAT. PAGE
AN 310-C18 1-1/8 12 22
Prices and deliveries on request
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SCREWS
NUMBER
NOM. SCREW SIZE
THD. PER IN.
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Last DASH NO. indicates length in sixteenths inch
AN3 to AN20 Hexagon Head, Fine Thread, Class 3 Fit Aircraft Bolts with hole drilled in shank
C—Corrosion Resisting Steel (Stainless Steel) to Spec. AN-QQ-S-770, Condition QT, Class II (Type 431).
H—Indicates drilled hole in head of Bolt
A—Indicates no drilled hole in shank of Bolt.
Last Dash No.—Refer to drawing for length of Bolt
Number Size Thd./In. Number Size Thd./In. Number Size Thd./In.
AN3 10 32 AN7 7/16 20 AN14 7/8 14
AN4 1/4 28 AN8 1/2 20 AN16 1 14
AN5 5/16 24 AN9 9/16 18 AN18 1-1/8 12
AN6 3/8 24 AN10 5/8 18 AN20 1-1/4 12
AN12 3/4 16
AN310 Castellated Nuts, Fine Thread, Class 3 Fit.†
AN315 Hexagon Plain Nuts, Fine Thread, Class 3 Fit †
AN316 Hexagon Double Chamfered, Double Countersunk Check Nuts, Fine Thread, Class 3 Fit †
AN320 Hexagon Shear Nuts, Fine Thread, Class 3 Fit.†
AN340 Machine Screw Nuts, Coarse Thread, Class 2 Fit.†
AN345 Machine Screw Nuts, Fine Thread, Class 2 Fit †
AN381 Corrosion Resisting Steel Cotter Pins to Spec. FF-P-386a, Amendment 2, Type C (Type 302)
AN427 100° Flat Countersunk Head Rivets F—Corrosion Resisting (Stainless) Steel to Spec. AN-W-24, Grade G, Condition A (Type 302 or Type 304 annealed).
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Manufacturers of STAINLESS STEEL FASTENINGS
CASTLETON ON HUDSON NEW YORK

BOOKS...

For copies of books and booklets reviewed, write directly to publisher listed.

. . . For Plant Engineers and Maintenance Supervisors

Industrial Piping

CHARLES T. LITTLETON. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. Illustrations, charts, diagrams, tables, formulas, index. 394 pp. $8.

If you tackle piping problems armed with a multitude of data sheets, leaflets, catalogs, and standard specs, you'll appreciate this book. It's a practical guide to pipe, fittings, and pipe material—all in one compact volume. There's a vast store of information here, arranged for easy reference.

There's a chapter on the design and installation of piping systems. And one on estimating piping cost. The author also discusses recently developed piping materials, alloys, and plastics—their pros and cons. Of special interest to purchasing is the table of valve equivalents covering eight major manufacturers.

. . . For Plant Executives and Methods Engineers

Systems Analysis for Effective Administration

NORMAN N. BARISH. Funk & Wagnalls Co., 153 E. 24th St., New York 10. Charts, diagrams, sample forms, index. 316 pp. $5.

Here are tested methods for analyzing office systems and procedures. They have been used successfully before. You may be able to put them to work to achieve better coordination, less costly operation.

The author covers the design, evaluation, selling, and installation of efficient office systems. But his emphasis is on making proper systems analyses. Basic principles of good practice are outlined, then illustrated with case examples. Common pitfalls and obstacles are discussed.

Turn the page

4 BIG REASONS
Why LYON Can Handle Your Sheet-Metal Subcontracts BETTER!

MAIL COUPON FOR THIS BROCHURE • IT TELLS ALL

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• Shelving	• Kitchen Cabinets	• Conveyors	• Economy Locker Racks	• Display Equipment	• Filing Cabinets	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Flat Drawer Files	• Drawing Tables	• Folding Chairs	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Tool Room Equipment	• Revolving Bins	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Welding Benches	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

SPECIFY STRONGER SAFER "HERCULES" FLATTENED STRAND

- 10% extra strength.
- Larger metallic area.
- Smooth wearing.
- Smooth running.
- Easier to rig.
- Extra safety
- Extra economy.
- RED-STRAND quality

SPREADS THE LOAD FOUR WAYS

"Hercules" Flattened Strand design spreads wear over four wires — not just one. This compact outer surface greatly reduces wear in grooves . . . helps keep them smooth. Triangular cross-section of strands permits smaller core, larger contact area between strands, and greater resistance to crushing. "Hercules" Flattened Strand Wire Rope offers greater strength and economy.

LESCHEN WIRE ROPE

Consult our Engineering Department for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis 12, Missouri. Distributors in all principal cities.

LOCALITES

for Better Light ON the Job

Directs Light Exactly Where Needed as Easily as Pointing Your Finger

MODEL 3267-H-174

Overall length 32¾". Three instantly adjustable joints. Flat oblong base for machine screw mounting.

Designed Especially for Machine Tools, and Work on Assembly and Inspection Benches

$6.12 EACH in pkg. of 6 Single Units $7.65 ea.

- Rugged Construction to stand strains and shocks
- Instantly Adjustable with full swivel ball and socket joints
- Infra-red Baked Enamel Finish—Exterior, Wrinkled Gray — Reflector Interior, high temperature White
- Reflector accommodates 100 watt A-21 medium screw base lamp
- Wired Complete with switch socket and 8 ft. oil resistant cord

WRITE FOR COMPLETE CATALOG of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO

Localites are available through selected distributors everywhere.

LOCALITE Fostoria for Light ON the Job

Reg. U. S. Pat. Off.

BOOKS . . .

Begins on page 302

. . . For General Reading

Herbert H. Dow: Pioneer in Creative Chemistry

MURRAY CAMPBELL & HARRISON HATTON. Appleton-Century-Crofts, Inc., 35 W. 32nd St., New York 1. Illustrated. 168 pp. $3.50.

On the lighter side, but not without plenty of food for thought, is this biography of Herbert H. Dow. It's a fascinating success story in the old tradition. It's the kind of a story from which men today can well draw inspiration.

Dow was not an ivory-towered scientist. He was basically "an old-fashioned free-enterpriser, creative, independent, dogged in purpose." His genius lay in an ability to translate chemical theory into profitable manufacturing processes. Dow summed up his own attitude when he said: "I can find a hundred men to tell me an idea won't work. What I want are men who will *make* it work."

Dow pioneered the mass production of many of the chemicals considered basic industrial essentials today. He constantly searched for new processes and production methods. As he himself said, "If we can't do a thing better than it's already being done, why do it?"

. . . For Industrial Relations and Personnel Executives

Frontiers of Personnel Administration

A Columbia Industrial Report. Dept. of Industrial Engineering, Columbia University, 116th St. & Broadway, New York. 150 pp. $12.50.

A report on the 1951 Conference on Industrial Personnel. Includes papers by prominent speakers on new developments in the field. An extensive bibliography lists recent books and magazine articles on personnel administration.

Turn the page

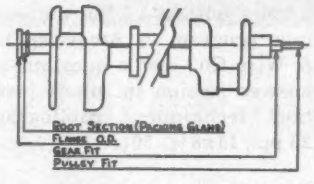
Salvage of rejects speeded by new metallizing alloy

outwears old bearing material 25 times

Automotive manufacturer replaces chrome plating installation with metallizing for salvage of mis-machined crankshafts; steps up output to 10 per hour

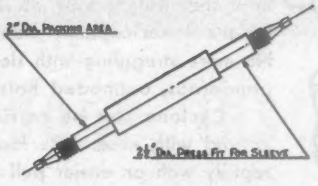
Sprabond Wire, the new self-bonding metallizing alloy, is speeding reject salvage in a wide range of production applications. It has been found particularly valuable in building up parts which have been machined undersize, or damaged by tool marks. Resulting surfaces are extremely hard and, due to their microscopic pore structure, tend to hold considerable amounts of oil. These factors produce excellent wear characteristics, some users reporting increases in service life as much as 25 times that obtained in any other way.

Application is simple and fast; only 3 operations: (1) the part is cleaned or undercut; (2) Sprabond Wire applied; (3) the surface finish-ground. Dovetailing and undercutting often not required and build-up can be carried to a feather edge. No danger of warpage because negligible heat is generated in the part during spraying.



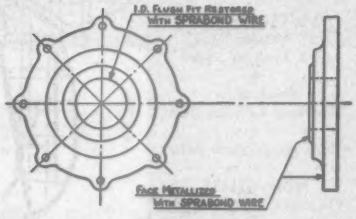
Better and faster than plating

Sketch shows automotive crankshaft of the type being reclaimed in quantity by large manufacturer. These parts were formerly reclaimed by plating, which was slow and expensive. With metallizing, however, production rate is 10 shafts per hour.



Where welding is impractical

Heat warping and consequent straightening costs made welding impractical for salvage of blower shafts such as shown above. Shafts formerly scrapped and replaced are now rebuilt. With Sprabond Wire metallizing, saving is $45.00 each.

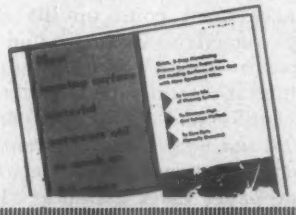


Fits restored—no re-machining

Press fit in electric motor end bell is frequently lost through wear. Welding is impractical here, too, because of warpage. But a few thousandths of Sprabond Wire on the I.D. builds a press fit so that even minimum grinding is often unnecessary. Savings per end bell—about $30.00.

Some other money-saving applications for the Sprabond Wire process

Cracked blocks and castings—flat surfaces—molds, patterns, match plates—sand holes thin sections—lathe ways—inside diameters—gas holes.



FREE BULLETIN Metco Bulletin 57B describes the advantages of the Sprabond Wire metallizing process in detail. Micro-photograph of Sprabond Wire coating on steel shows how it works. Use the coupon to send for your free copy today. No obligation, of course.

The following trade names are the property of Metallizing Engineering Co., Inc.: METCO®, SPRABOND WIRE. ®Reg. U. S. Pat. Off.

R. J. McWaters
Metallizing Engineering Co., Inc.
38-16 30th St., Long Island City 1, New York

Please send me Bulletin 57B.

NAME_____

COMPANY_____

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CITY_____ STATE_____

METALLIZING ENGINEERING CO., INC.
38-16 30th STREET — LONG ISLAND CITY 1, N. Y.
In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD., Chobham near Woking, England

CM

LIGHT WEIGHT—HEAVY DUTY

CYCLONE

Picture this: a high speed chain hoist that weighs only 35 lbs. for the 1 ton capacity model. No more struggling with slow, ponderous, outmoded hoists. A Cyclone can be carried around with ease. Lifts loads rapidly with an easier pull on the chain. Can take the rough handling of maintenance crews or the continuous duty of production application. Workmen are grateful... do their work faster, safer and better when they have a Cyclone.

AVAILABLE IN capacities from ¼ to 10 ton.
For all the construction details write for Bulletin 145 C or phone your local distributor for a demonstration in your plant.

CHISHOLM-MOORE

HOIST CORPORATION

Affiliated with Columbus McKinnon Chain Corporation

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: New York, Chicago and Cleveland • Distributors Everywhere

BOOKLETS

Begins on page 302

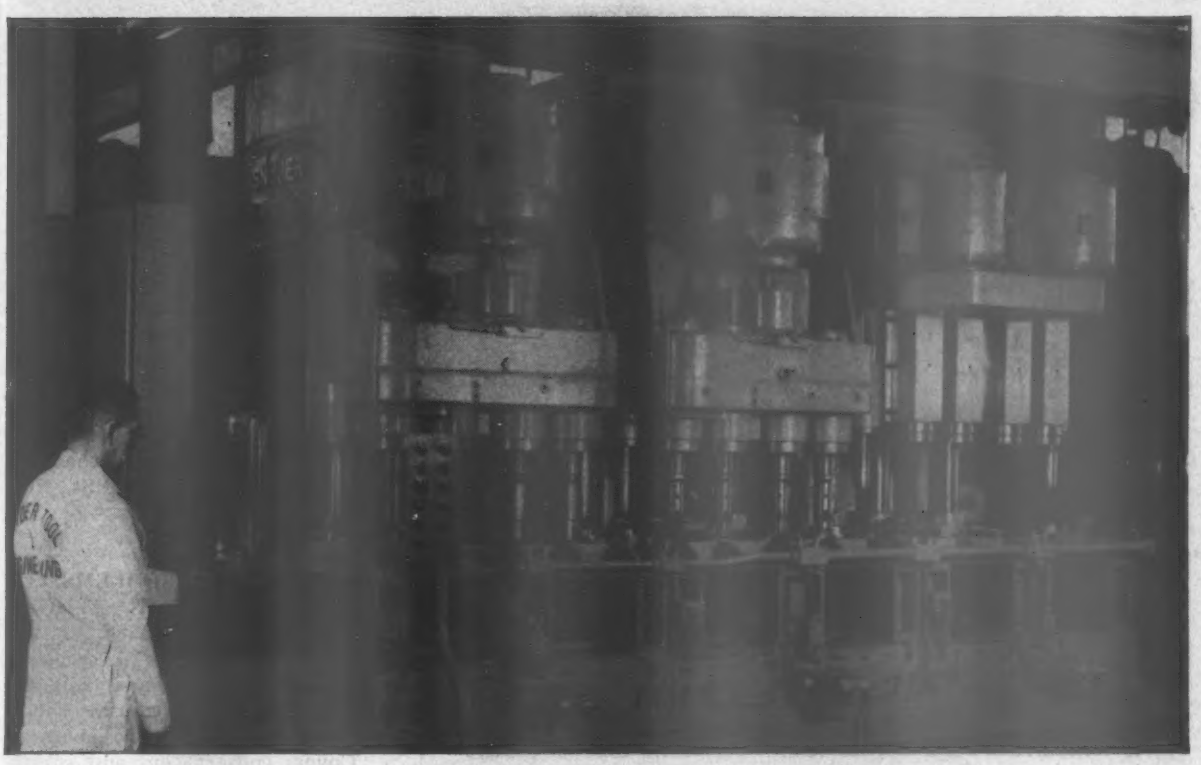
THE OPERATION OF SICKNESS BENEFIT PLANS IN COLLECTIVE BARGAINING. Dept. of Economics and Social Institutions, Industrial Relations Section, Princeton Univ., Princeton, N. J. A survey of 10 representative plans. Discusses financial arrangements, administrative procedures, and adequacy of benefits. Chart outlines mechanics of plans. 109 pp., 6x9¼. $2.50.

SABOTAGE AND PLANT PROTECTION. Chamber of Commerce of the United States, Dept. of Manufacture, 1615 H St., N. W., Washington 6, D. C. Comments by industrial and military experts (including the production director of the Munitions Board.) Includes a brief outline of the anti-sabotage program at American Steel & Wire Co., also a question-and-answer session on plant protection techniques. Bibliography. 25 pp., 11x8½. 50¢.

PROTECTIVE MAINTENANCE OF MOTORS AND GENERATORS. National Electrical Manufacturers Assn., 155 E. 44th St., New York 17. For the electrical maintenance man—a ready reference for the handling of everyday motor problems. There's also an appendix of NEMA standards, and a glossary of motor and generator parts. 63 pp. 50c.

EXECUTIVE COMPENSATION: COMPANY POLICIES AND PRACTICES. American Management Assn., 330 W. 42nd St., New York 18. Four members of top management point up the need for effective compensation of executives, and discuss the forms which it should take. They cover incentive and bonus compensation, and non-financial incentives such as retirement and security. One paper takes a stab at "How Much Should an Executive be Paid?"

Turn the page



Three jobs done, instead of one!

Howell Type F Motor. A high slip, high torque motor designed for punching and boring operations. Sizes ½ to 200 H.P. in open frames; ½ to 125 H.P. in enclosed frames.

Howell Type SC, general purpose, protected-type Motor. Ideal for driving machines and equipment where atmosphere is moisture- or dust-free. Horizontal or vertical mounting.

This 7 station transfer-type boring machine was designed and built to replace *three* machines!

It rough bores, semi-finish bores and finish bores cylinder sleeves to exacting tolerances in one continuous, automatic operation.

Howell engineers worked closely with this manufacturer to provide the right type and size motor for each application. Two 15 H.P. and two 5 H.P. Howell Industrial Motors supply dependable power for the twelve boring spindles. A 7½ H.P. Howell motor operates each of the three hydraulic pumps which control the rough, semi-finish and finish heads. Each motor was engineered for its job!

This is a typical example of the service Howell offers you. We will work with you, both in your plant and at Howell, to design precision-built, quality motors for your jobs.

Our research facilities, engineering experience and manufacturing skill are at your service. May we help you?

HOWELL ELECTRIC MOTORS COMPANY

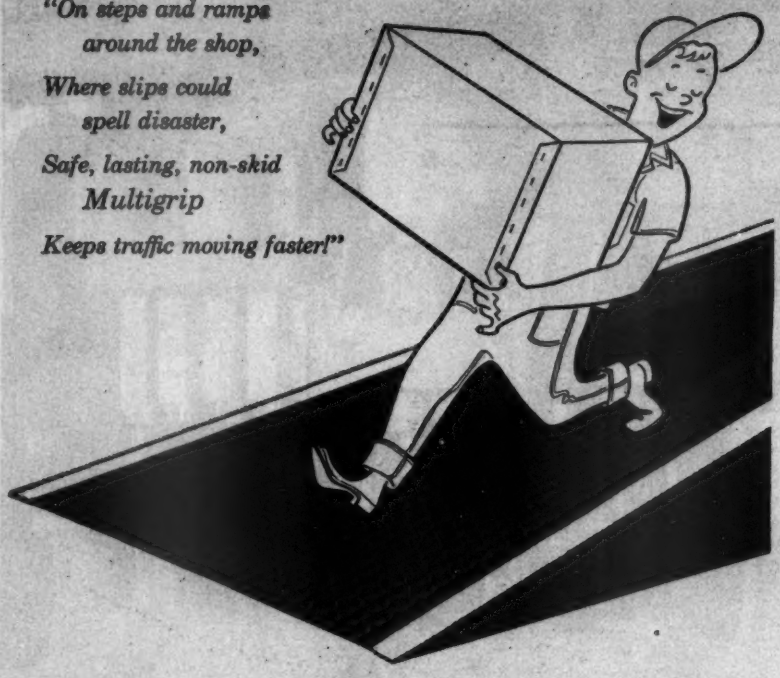
Howell, Michigan

HOWELL Red Band MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built industrial motors since 1915

"On steps and ramps around the shop,
Where slips could spell disaster,
Safe, lasting, non-skid Multigrip
Keeps traffic moving faster!"



U·S·S MULTIGRIP FLOOR PLATE is comfortable to walk on, comfortable to work on. And, wet or dry, Multigrip offers skid resistance and positive traction in every direction . . . cuts down on accidents due to slips and falls. The sloping sides of the scientifically-designed risers make it impossible to trip on them. Multigrip is attractive in appearance. Easy to clean. Permanent. *Safe.*

Install U·S·S Multigrip wherever sure footing is essential. On ship decks and walkways. On machinery steps and platforms. Or to cover entire factory floors.

Get further information about Multigrip from your nearest steel warehouse or write to us direct.

United States Steel Company, Pittsburgh • Columbia Steel Company, San Francisco
Tennessee Coal, Iron & Railroad Company, Birmingham • United States Steel Export Company, New York
United States Steel Supply Company, Warehouse Distributors, Coast-to-Coast

U·S·S MULTIGRIP FLOOR PLATE 1-1143

UNITED STATES STEEL

BOOKLETS

Begins on page 302

NICKEL - MOLYBDENUM - VANADIUM ALLOY STEEL SHIELDED ARC WELDING ELECTRODES (LOW HYDROGEN TYPE). Summarizes performance of commercially available rods in welding high-strength steels without preheat. Welds consistently exceeded 110,000 psi. yield strength with maximum ductility. The International Nickel Co., Inc., 67 Wall St., New York 5.

MATERIALS PROBLEMS OF THE EMERGENCY. American Management Assn., 330 W. 42nd St., New York 18. A series of conference papers analyzing the present state of materials shortages, and what to do about it. Covers conservation and substitution of materials, and effects of government controls. A panel session discusses the quality control policies of the armed services. 59 pp., Members, $1; nonmembers, $1.25.

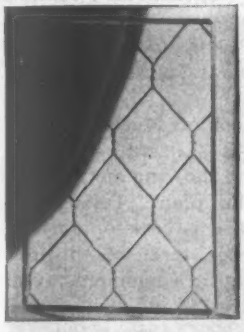
TECHNICAL DATA BOOKS. Lefax, Sheridan Bldg., Philadelphia 7. Pocket-size, loose-leaf booklets containing about 140 removable pages of selected data. New and revised data books include these: Air Conditioning, Machinists' Data, Metals, Piping Data, Power Transmission Machinery, Steam Engineering, and Welding. Each $1. Catalog with more than 2000 listings sent free.

COUNSELING EXECUTIVES AFTER MERIT RATING OR EVALUATION. American Management Assn., 330 W. 42nd St., New York 18. There are plenty of merit rating plans for gaging executive abilities. But how do you sit down and talk frankly with your executives about their performances — their strengths and weaknesses? This booklet suggests one approach. 15 pp. 25¢.

MISSISSIPPI WIRE GLASS

the Approved Fire Safeguard

Polished Misco Wire Glass, highest achievement of the rolled glass manufacturer's art, combines the utmost in protection with modern beauty.



Polished Wire Glass by Mississippi, approved fire safeguard, helps prevent drafts . . . is effective in holding fires within bounds of origin.

Records over the years conclusively demonstrate that Mississippi Wire Glass, approved fire retardant No. 32, is a dependable defense against the spread of fire. For over half a century architects and engineers have specified Mississippi Wire Glass . . . the original solid wire glass upon which the Underwriters' Standard was based in 1899 . . . the standard today by which all others are judged. Mississippi Wire Glass affords constant protection at minimum cost in windows, doors, transoms, skylights, fire escapes, vertical shafts, partitions, exterior walls and all other places where fire or breakage protection is required. Carried in stock by distributors of quality glass everywhere.

Where full vision is not required, obscure Mississippi Wire Glass is available with either hexagonal or Misco wire netting.

MISSISSIPPI *Glass* COMPANY

88 ANGELICA ST. SAINT LOUIS 7, MO.

NEW YORK • CHICAGO • FULLERTON, CALIF.

This Seal Identifies Mississippi Wire Glass

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

Send For Catalog No. 51

Free Samples on Request.

For details see Sweet's Architectural File

TWO HOSES...ONE LINE!

TWIN-WELD HOSE SPEEDS WELDING—
eliminates tangled lines

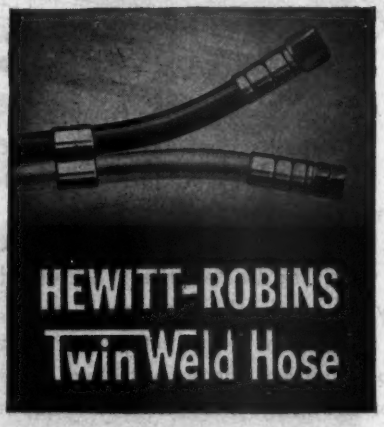
That's right—with Hewitt-Robins patented* Twin-Weld Hose, you have *two* hoses but only *one* line to handle! This modern hose gives *double* safety, *double* convenience, to acetylene welding equipment.

Twin-Weld's green oxygen line and red acetylene line are actually *bonded into one piece*, yet separate easily for coupling to tanks and torch. Gone is the dangerous mass of tangled individual lines. Instead, the operator has one neat, flexible, non-kinking line that makes his job safer, his work quicker and more efficient.

Twin-Weld saves time in getting welding equipment into operation, makes it easy to reach the work, change position at will, or work in close quarters.

*U. S. Patents 2,122,335 & 2,136,220

For all welding, cutting and chipping service, there's no better hose made! Call your Hewitt-Robins distributor, listed in the classified telephone directory, or write Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, N. Y.



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FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS
RUBBERLOKT WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS
TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

INDUSTRIAL FILMS

. . . Do you have a film or films that might help management do a better job? Help employees learn their job faster, better? If so, tell us about it and we'll pass the information on to those who can use what you have.

Pigs and Progress is a new film on the story of aluminum. Starts with the mining operations, shows the alumina mill, how alumina is reduced to metal, how the ingots are converted into sheet, plate, wire, etc.; finally how aluminum is fabricated into useful products. 16mm., sound, color, runs 26 min.

Motion Picture Dept., Reynolds Metals Co., 2500 S. 3rd St., Louisville 1, Ky.

Production Brazing With Low Temperature Silver Alloys takes the viewer through seven industrial plants using silver alloy brazing in production applications, including several novel uses. Shows how fluxing operations and heating are done in high-speed operations. 16mm., sound, color.

Training Dept., Handy & Harman, 28 Fulton St., New York 38.

The booklet **More Brilliant Projection** is a useful guide for planning and showing motion pictures in the plant. Tells what type of screen is best for various size audiences, discusses projectors, seating arrangements, etc. Available free from:

Radiant Mfg. Corp., 1204 S. Talman Ave., Chicago 8.

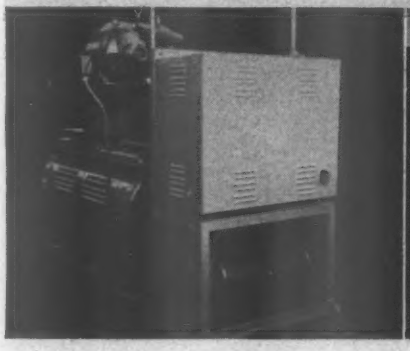
Induction Heat is a new film showing some of the production-line uses of induction heating. They include annealing, brazing, hardening of localized areas. Brief visual explanation of how induction heating works. Runs 20 min., 16mm., sound, color.

Allis-Chalmers Mfg. Co., Industrial Press Dept., General Machinery Div., Milwaukee.

Century SELECTIVE SPEED *Drives*

Permit Exact Speed Control for Increased Production • Better Quality Control

Here are a few typical applications
that demonstrate the benefits which you can get from Century Selective Speed Drives on either new equipment or your present set-up.

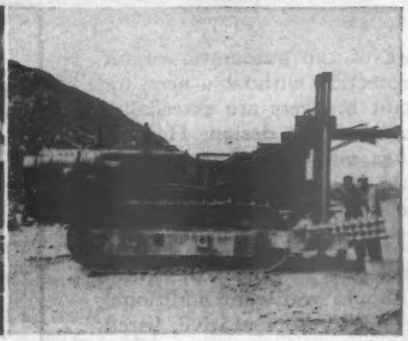


Production increased, machining quality was improved, accuracy is held closer and set-up time is reduced as a result of achieving optimum peripheral cutting speeds on this boring mill.

Costs are cut and scrap is reduced because maximum speeds are easily controlled for different classes of work done on this printing press. Accurate control maintains exact register of multiple copy forms.

Better quality control is maintained over production of latex threads because of the wide selection of speeds plus smooth acceleration and deceleration. Extreme flexibility permits fast change-over when a new gauge, or size, of rubber thread is to be produced. Instant stopping is also an important protective feature.

Uncoilers and coilers with pinch rolls and looping device, require a wide range of inter-related automatic sensitive speed changes. As the coils of material unwind from one spool and wind on another spool, the diameters change yet the speed through the electrolytic process must be at a constant rate.



Operating speeds are instantly controlled on this earth auger drill rig. Permits operator to change speeds according to the type of earth being drilled. Drilling is done to depths of 100 feet in strip mining.

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Offices and Stock Points in Principal Cities

2712

Century Electric Company is celebrating its 50th year in the electrical industry

Where DUST is a HAZARD

Above is a typical Ⓕ DUSTITE feeder panelboard, and below a Ⓕ DUSTITE lighting panelboard. Both are Underwriters Laboratories' approved for Class II, groups E, F, & G, Hazardous locations.

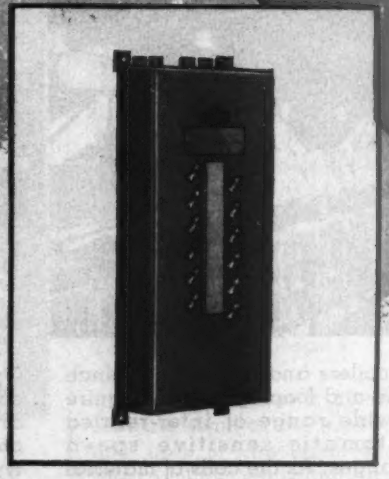
Similar vapor-proof (not explosion proof) type panelboards are also made by Ⓕ

Here's maximum protection where volatile dust presents a hazard in the distribution of power and light. Regardless of external dust conditions, Ⓕ DUSTITE Panelboards provide safe, dependable performance because *they are dust-free inside.*

Dust is sealed out by means of welded hubs for conduit outlets . . . welded box corners . . . external mounting brackets . . . and a solid steel front plate with gasket protection all around.

Ⓕ Dustite panelboards are of the automatic circuit breaker type, which provide protection without a need for replacement of any parts. Circuit breakers are externally-operated by a Dustite mechanism of Ⓕ design. Handles operate through dustite bushings and engage the handle of the circuit breaker *inside* the cabinet. ON, OFF and TRIPPED positions are indicated on the front of the cabinet.

So don't take chances where dust is a hazard. Install an Ⓕ DUSTITE Panelboard. Should you want additional information, contact your nearest Ⓕ representative, listed in Sweets, or write for bulletin No. 302.



Capacities of Ⓕ DUSTITE Panelboards are 15 to 600 amps, 250 volts AC or DC and 600 volts AC main lugs only, or main circuit breaker.

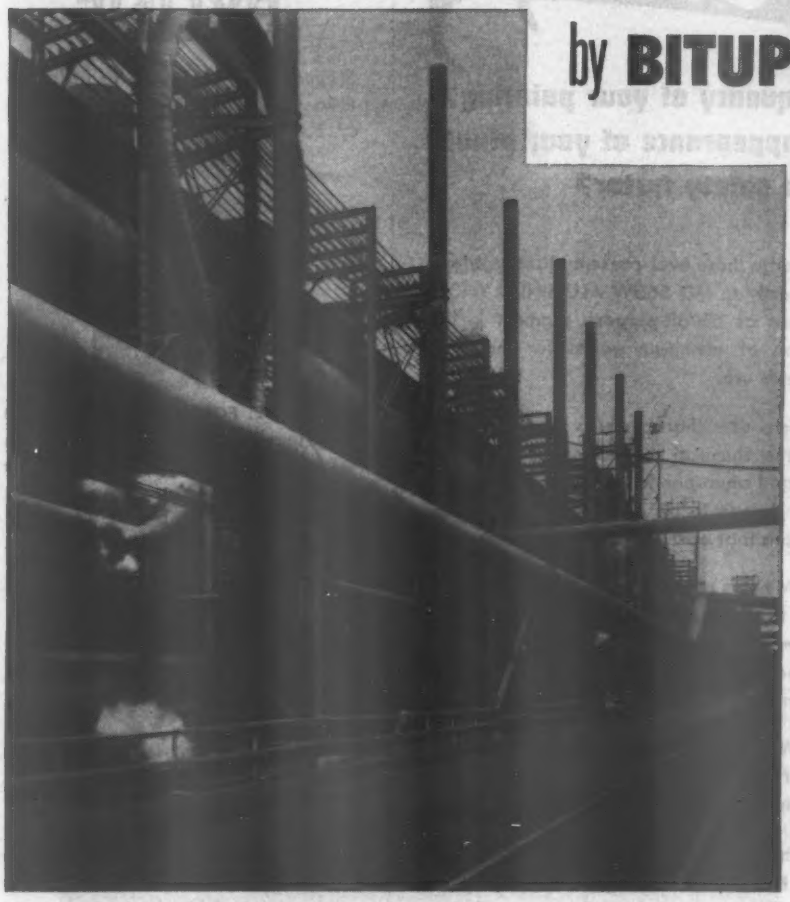
FA TRADE MARK

Makers of BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

(Our 60th Year)

Large Steel Plant Protected Against Corrosion

by BITUPLASTIC® No. 28



SEVERE corrosive atmospheres around these big blast furnaces are a challenge to *any* protective coating. Bituplastic No. 28, a heavy-duty Koppers Coating, has met this challenge . . . with plenty to spare.

Here's one of the reasons: each coat of Bituplastic No. 28 protects metal with a thick, tough film—a film that is *five to eight times thicker* than conventional protective coatings. This extra-thick, extra-tough barrier against corrosion provides better protection, lasts longer, and costs far less to maintain.

Bituplastic No. 28 is one of Koppers complete family of Bitumastic® Industrial Protective Coatings—specially formulated to control specific kinds of corrosion. Send for a set of our free booklets. They show how Koppers Coatings can cut *your* corrosion losses.

Here's why Bitumastic Coatings give *lasting* protection against corrosion and deterioration of *metal, masonry and concrete.*

- **Koppers Coatings, unlike maintenance paints, are specially formulated from a tar-pitch base* that is, for all practical purposes, impervious to water.**
- **Koppers Coatings provide a tough, impenetrable barrier to corrosive elements.**
- **Koppers Coatings provide up to 8 times the film thickness of conventional paint coatings.**
- **Koppers Coatings stop corrosion caused by moisture . . . acid fumes . . . alkaline fumes . . . corrosive soil . . . salt air . . . heat.**

**Hi-Heat Gray contains heat-resistant metallic base*

Koppers Company, Inc.
Tar Products Division, Dept. 1053T
Pittsburgh 19, Pa.

Please send me without charge or obligation your booklets on corrosion prevention.

Name.....

Address.....

City.....Zone....State.....

KOPPERS **BITUMASTIC PROTECTIVE COATINGS**
REG. U.S. PAT. OFF.

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

KOPPERS COMPANY, INC., Tar Products Division, Dept. 1053T, Pittsburgh 19, Pa.

Are You Seeking

to

* reduce the frequency of your painting?
* improve the appearance of your plant?
* increase your safety factor?

Some ideal industrial uses of Aluminum Paint pigmented with MD 565W ALUMINUM PASTE

Lightens plant interiors

Preserves fire escapes and outside iron work

Improves appearance of gasoline pumps

Protects water tanks

A good preservative for building exteriors

A protector of boilers and steam pipes

Protects metal fences

Improves appearance and protects storage tanks

The answer to these ever-present plant problems points directly to MD 565W ALUMINUM PASTE and its use as an all-purpose pigment in the formulation of aluminum paints for industrial maintenance use.

The particle size characteristics of MD 565W slow up the chemical reaction of the paint to weather and atmospheric conditions. This causes the color change to be at a much slower rate, which means that each painting lasts longer.

MD 565W helps give your equipment and plant interiors (and exteriors, too) that pleasing appearance of being painted just "last week." Paints made with it approach a whiter, brighter finish than is possible with any metallic pigment.

MD 565W provides a smooth even finish without glare. At the same time, it brightens dark corners, thus promoting increased safety.

Specify that MD 565W ALUMINUM PASTE be used in the formulation of the ready-mixed Aluminum Paint you purchase for your painting. In those paints which you formulate, specify MD 565W in your pigment purchases.

Complete line of MD ALUMINUM PIGMENTS meets all the requirements of a wide range of standardized and specialized Aluminum Paint applications.

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your copy of Bulletin 505

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MD Powders

ALUMINUM PASTES
ALUMINUM POWDERS
GOLD BRONZE POWDERS

Since 1916

BEHIND THE BYLINE

Meet some of the men in industry who wrote articles for this issue of FACTORY.

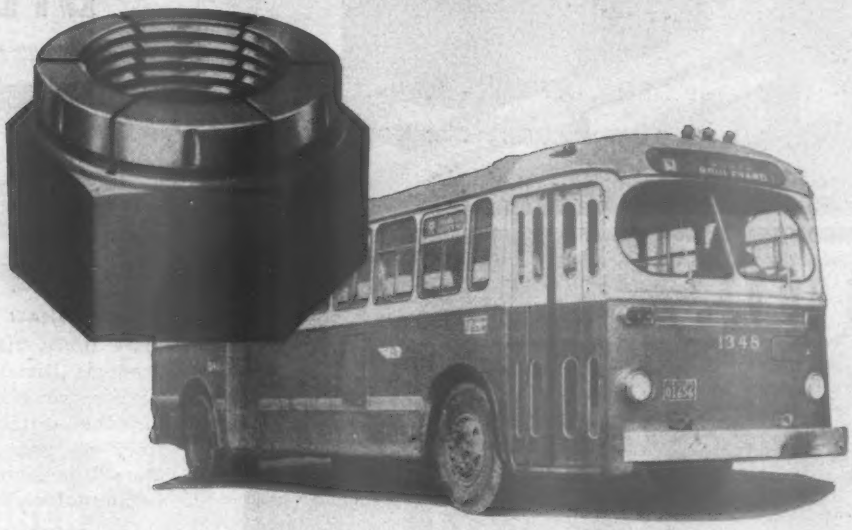
EDWARD E. FORSYTHE is a process engineer for B. F. Goodrich in Akron. He's worked there since graduation from Carnegie Tech in 1939, except for 4 years in the Army. On page 96 he tells about Goodrich's zipper conveyor.

PHILIP B. JONES is now an industrial engineer in the organization planning and evaluation department at Corning Glass Works. When he wrote about incentives (page 123) he was with the Brown Instrument Division, Minneapolis-Honeywell.

BOB ULIN has been a member of McGraw-Hill's economics department for four years. He's had a major hand in the McGraw-Hill surveys of capital expansion, co-authored *Making Capitalism Work*. He gives you a forward look on page 108.

Turn the page

FLEXLOC® SELF-LOCKING NUTS



help PTC to "keep 'em rolling"!

PTC mechanic Bob Casey tightens Flexloc locknuts used on rear axle flange of PTC bus.

Every day thousands of Philadelphians depend on Philadelphia Transportation Company buses. To "keep 'em rolling", PTC's maintenance must be constant and thorough, since minor failures often cause major breakdowns.

For example, the hex nuts on bus rear axle flanges were being loosened by vibration, despite periodic inspections. Sheared studs resulted. Replacements were expensive, disrupted schedules and loss of riders' goodwill even more so.

PTC tried FLEXLOC Self-Locking Nuts, found them a simple, economical solution to the problem.

FLEXLOCs stayed *tight*, eliminated shearing of studs. Yet FLEXLOCs were easy to remove when necessary, could be re-used again and again. Furthermore, FLEXLOC *dependability* reduced the number of maintenance checks needed, effecting additional savings.

If you have to contend with vibration in your business, try FLEXLOC Self-Locking Nuts—free! Just tell us the size, and we'll gladly send samples.

FLEXLOC Self-Locking Nut, "regular" type. FLEXLOC Self-Locking Nut, "thin" type. FLEXLOC Self-Locking Nut, external wrenching type.

SPS STANDARD PRESSED STEEL CO.

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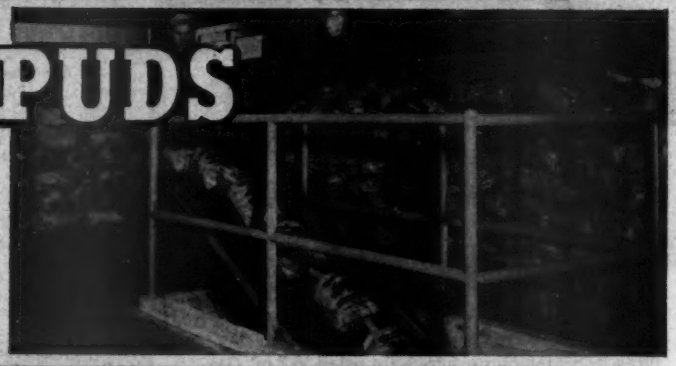

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BEHIND THE BYLINE

Begins on page 314

R. J. MINSHALL is a president three times. He heads up Pesco Products Division, Borg-Warner Corporation (he put on that hat for the methods improvement story on page 90); also steers Marvel Schebler and Cleveland Commutator divisions.

F. J. VORLANDER has had 25 years of electrical experience with public utilities and electrical contractors. Now he's handling technical problems in the field for Champion Lamp Works, Lynn, Mass. Tells about group replacement of incandescent lamps on page 134.

J. C. EASLAND began work at The Trane Company in 1935 as a power brake operator. While working up through production jobs, he handled industrial relations committee jobs on the side. Manpower control (page 136) is part of his present job as manager of Trane's industrial relations department.

Valuable information on how to package

your government orders

Packaging machines and parts to government specifications calls for specialized experience and materials. In this vital step in completing a government order Dearborn can help you.

Dearborn stands ready to supply the government specified materials you will need. These include the rust preventives, wrappers and sealers for the widely known Method IA . . . case liners . . . fingerprint neutralizers. Other Dearborn materials include cleaners, rust removers and VPI, the specially treated paper that gives off an invisible protective vapor.

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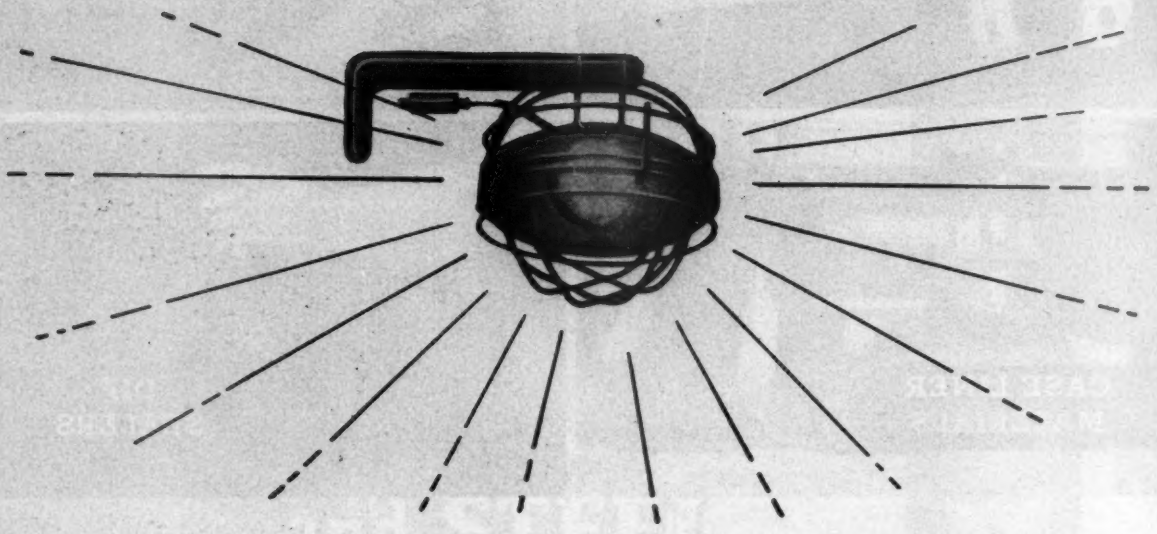

THE FIRE WATCH THAT NEVER SLEEPS

ARE you ready for fire *when* it strikes? Week ends? Nights? During shut downs? Put a Kidde Automatic Fire Extinguisher System on the job—it's *always* on the alert against fire.

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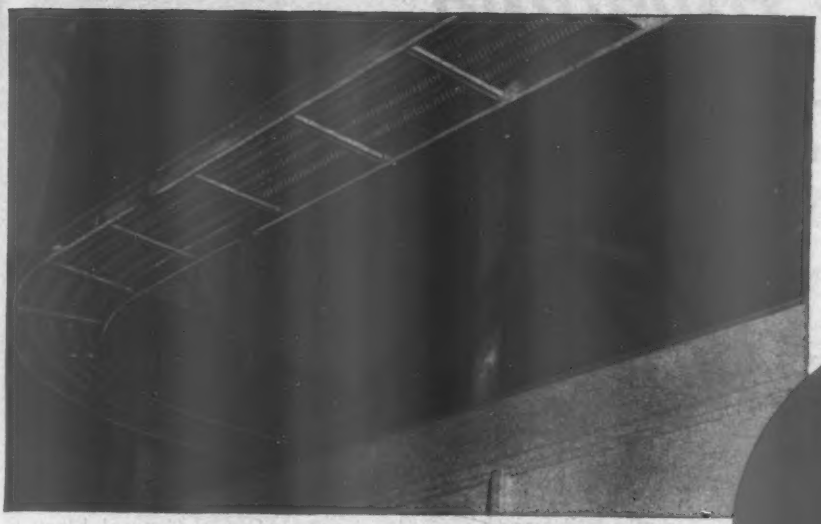

Standard three-conductor, 600 v, interlocked armor cable. Also available for 110 v to 15,000 v circuits.

How can you cut power circuit installation time?

For almost twenty years the flexibility of G-E varnished-cambric interlocked armor cable has helped users cut installation time.

THE REASON: G-E interlocked armor cable for plant power circuits was specifically designed for fast installation in even the most difficult places. Its raceway is built in—ready to install. It is so flexible you can readily bend it around pillars, I-beams, and partitions—requires no special installation or time-consuming layout techniques. Because of its light weight, you can string G-E interlocked armor cable over long runs without pull boxes or lay it up on existing beams.

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To get complete data, write Section W77-1034, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

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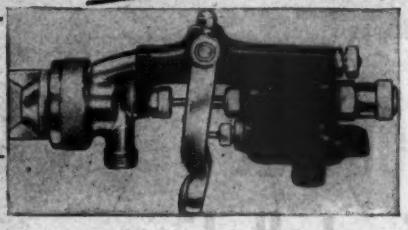


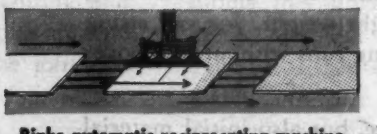
Model 7R automatic spray gun—designed for mechanical operation in Binks Reciprocating Machines.

Binks automatic spray guns increase productivity of your manpower

Binks heavy-duty, automatic spray finishing equipment brings finishing costs down to a new low. At the same time, it improves the quality and uniformity of your finishes. Adaptable to almost any product ranging from many-sided objects to flat panels... Binks automatic guns operate like magic. They start and stop automatically. Starting is instantaneous without spitting or dripping. Virtually no supervision is needed when these guns are at work. Hour after hour, they apply beautiful, uniform finishes of precise film thickness.

Binks automatic spindle machine

Finishes round, cylindrical, many-sided or hollow products...inside and/or outside. The product spins in front of Binks Model 21 guns. Guns cut off automatically between units and do not spray when empty spindles pass.



Binks automatic reciprocating machine

Designed for finishing flat surfaces such as table tops, range parts, outdoor signs, and many other products. Mechanical arms sweep Binks Model 7R guns back and forth across the conveyor. Guns cut off between units, thus saving paint.

An Invitation—Send or bring samples of your product to Binks' Laboratory. Tests will be run on automatic equipment to determine exactly what economies can be expected. There is no obligation for this service.

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Begins on page 139

ELECTRICAL EQUIPMENT

"Packaged Power"

8 This 24-page bulletin describes "packaged" electric power units, comprised of standardized components. Each "package" is a complete, factory-assembled unit. General Electric Co.

Eitherend Connectors

9 Catalog describes "eitherend" electrical connectors. Both halves of connector are identical, so that any two halves can be connected, without male and female matching. Illustrates many applications. Albert & J. M. Anderson Mfg. Co.

Battery Charger

10 Single- and 4-circuit motor generator battery charging equipment is shown in two folders offered. Photographs show construction. Lists features, describes ease of operation. The Electric Products Co.

PIPELINES

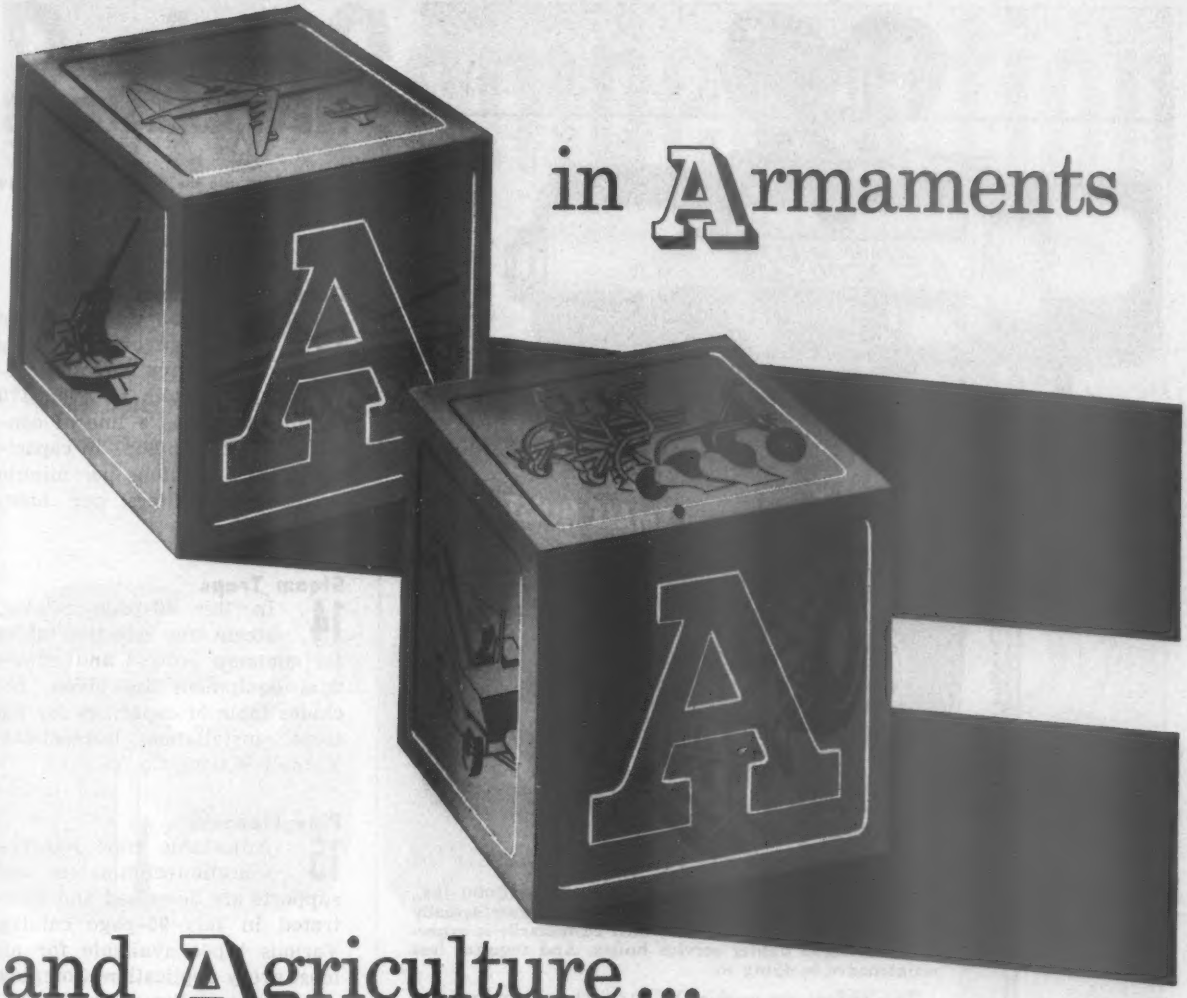
Pumps

11 Over 50 specification sheets for centrifugal pumps, deep well pumps, self-lubricating power pumps, pumps for handling oil, kerosene and gasoline, many others. Includes 11 pages of useful pump data, formulas, etc. The F. E. Myers & Bros. Co.

Flexible Metal Hose

12 This 12-page catalog describes, pictures, gives complete applications for a line of flexible metal hose products. Available for standard or high-pressure applications. Universal Metal Hose Co.

Turn the page



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By every standard of comparison Gas is the ideal fuel for industrial process applications. The automatic controllability of Gas at any temperature, is just one of the features worth investigation. Be sure to ask your Gas Company Representative for information about applying Gas and Modern Gas Equipment.

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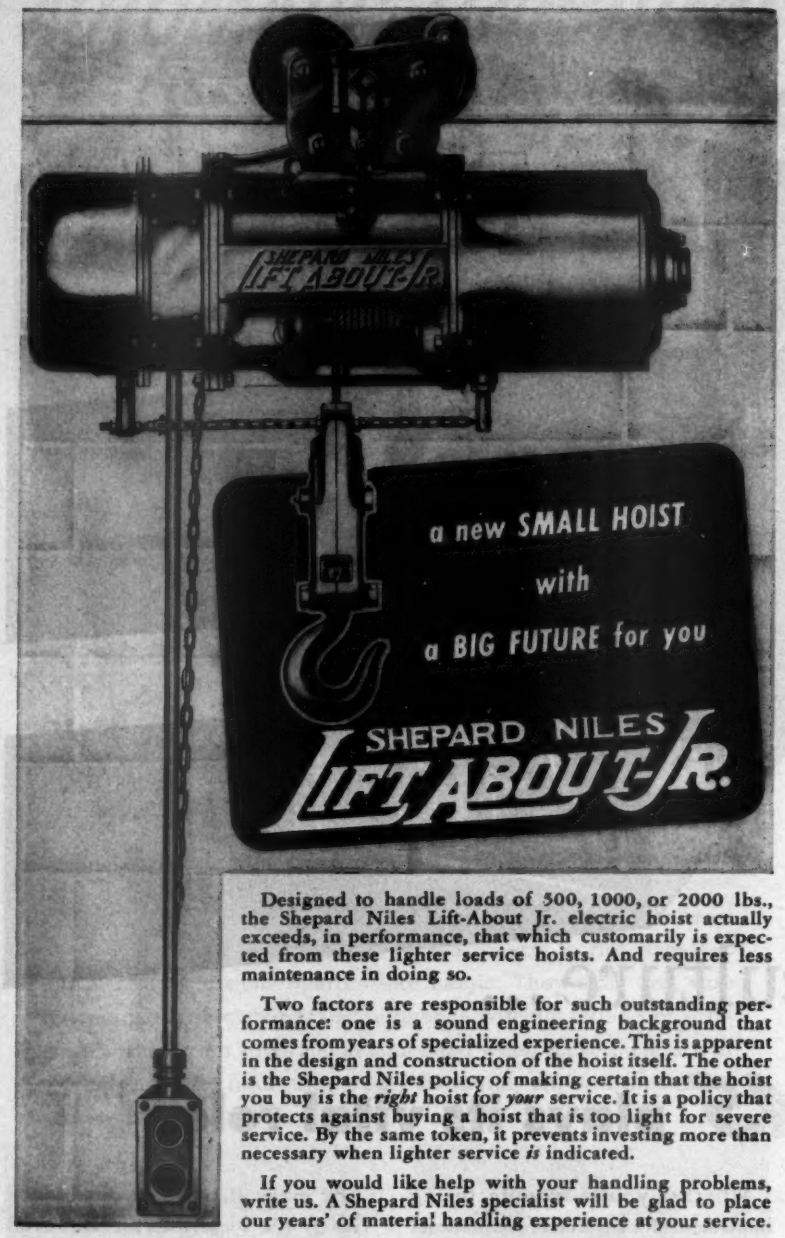

Designed to handle loads of 500, 1000, or 2000 lbs., the Shepard Niles Lift-About Jr. electric hoist actually exceeds, in performance, that which customarily is expected from these lighter service hoists. And requires less maintenance in doing so.

Two factors are responsible for such outstanding performance: one is a sound engineering background that comes from years of specialized experience. This is apparent in the design and construction of the hoist itself. The other is the Shepard Niles policy of making certain that the hoist you buy is the *right* hoist for *your* service. It is a policy that protects against buying a hoist that is too light for severe service. By the same token, it prevents investing more than necessary when lighter service *is* indicated.

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Begins on page 139

Controlled Volume Pumps

13 Feature of this 24-pager is four pages of color charts giving the relative corrosion resistance of metals to over 170 chemicals. Shows a line of controlled volume pumps in capacities from 50 gallons per minute to three milliliters per hour. Milton Roy Co.

Steam Traps

14 In this 20-page catalog, steam trap selection tables for common process and industrial equipment are given. Includes table of capacities for the traps, installation instructions. Yarnall-Waring Co.

Pipe Hangers

15 Adjustable pipe hangers, vibration eliminators, and supports are described and illustrated in this 95-page catalog. Various types available for almost every application. Complete specifications, dimensioned drawings. 25-page section contains data, formulas. Blaw-Knox Co.

Differential Converter

16 A mercuryless flow meter, with flow control and continuous range change adjustment from 0-20 to 0-200 inches of water is described in this 16-page booklet. Lists applications. Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

Steam Traps

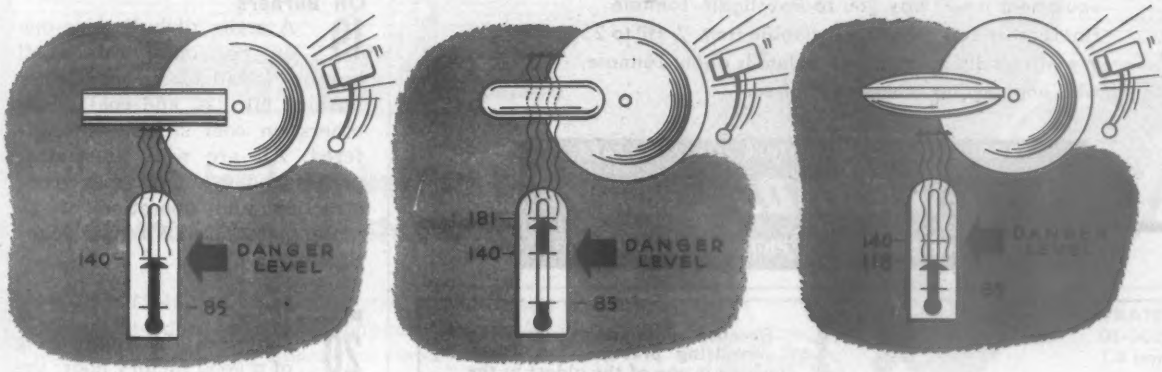
17 This 32-page booklet describes thermostatic and expansion steam traps; weight-operated traps for steam, air, and gasoline; steam, air and gas separators. Capacity tables, installation diagrams included; plus a section of data, charts, and formulas. W. H. Nicholson & Co.

Turn the page

Rate Compensation

A New Principle of Fire Detection

Fenwal DETECT-A-FIRE horizontal mount combines unique operation with smart design



THE SHELL REACTS!

Fenwal **DETECT-A-FIRE** unit, activated by its temperature sensitive shell, responds *only* when the *temperature of the surrounding air* reaches predetermined danger level.

Do Away With . . .

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In fixed temperature detection the air temperature rises well above the danger level because of time needed for the device to absorb heat before responding.

FALSE ALARMS

In rate-of-rise type detectors calibrated to operate at a predetermined rate of temperature rise, false alarms may occur even under non-fire conditions.

New RATE - COMPENSATION principle assures positive fire detection for plants, ships, institutions, all commercial, mercantile and public buildings.

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Begins on page 139

BUILDINGS

Floors

18 Pocket-size, 32-page booklet tells where to look for bad floor conditions, how they can be corrected. Picture sequences show resurfacing and patching methods. Stonhard Co.

Coal Stokers and Oil Burners

19 A series of bulletins—one on horizontal rotary oil burners (available in models for burning oil, gas, and coal); four others on coal stokers—are offered. All are well illustrated; photos and drawings show construction and operation of all major parts. Iron Fireman Manufacturing Co.

Floors

20 Describes the engineering of a good factory floor; the conditions to be considered in planning a floor. Photos of floors under construction, before-and-after photos. Includes survey chart for checking your floor. Flash Stone Co., Inc.

Incinerators

21 Describes and illustrates incinerators for every type of service; dry waste, garbage, and wet refuse, etc. Many photos show construction. Lists capacities (in pounds per hour) of all units. Philbrico Jointless Firebrick Co.

Lighting Fixture

22 "Anchorlite," a flexible, suspended lighting fixture for use wherever temporary lighting is needed underneath any type of equipment, is shown in this folder. Typical applications: illuminating interior of freight cars, trucks, and trailers; bin lighting. The Pyle-National Co.

Turn the page

When hard-to-get tubes are a "MUST"

PHONE YOUR G-E TUBE DISTRIBUTOR!

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TUBES ARE ESSENTIAL TO PRODUCTION. Installing new electronic tubes can't be delayed . . . else equipment shuts down and work piles up, while assembly-line output slows—may even cease.

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YOUR G-E TUBE DISTRIBUTOR IS EAGER TO HELP YOU! He values your patronage. He wants your business tomorrow, as well as today. Jot down the phone number of your G-E tube distributor now, so that you can call him instantly in emergencies! And remember . . . every tube dollar you invest with him buys G-E quality, G-E proved reliability and long life!*
Electronics Department, General Electric Company, Schenectady 5, New York.

**General Electric builds and markets more industrial electronic tubes than any other manufacturer, evidence of G-E tube excellence and value.*

● Thyratrons like those at right control the d-c motors powering lathes, millers, grinders, other high-speed tools which shape your product. Add *ignitrons* for welding control . . . *phanotrons* for current rectification . . . *pliotrons* for induction and dielectric heating . . . *phototubes* for counting, sorting, and inspection. The modern factory is a complex of electronic tubes that mastermind equipment of all types. 100-percent use of General Electric tubes in your plant contributes to top efficiency and sustained high output!

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1.5 amp

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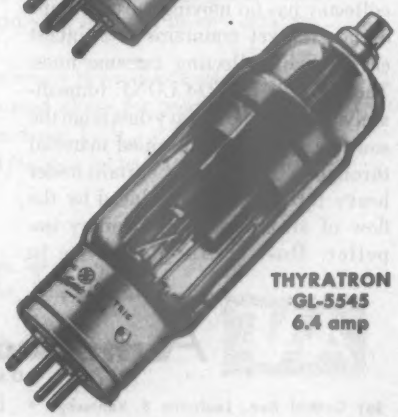

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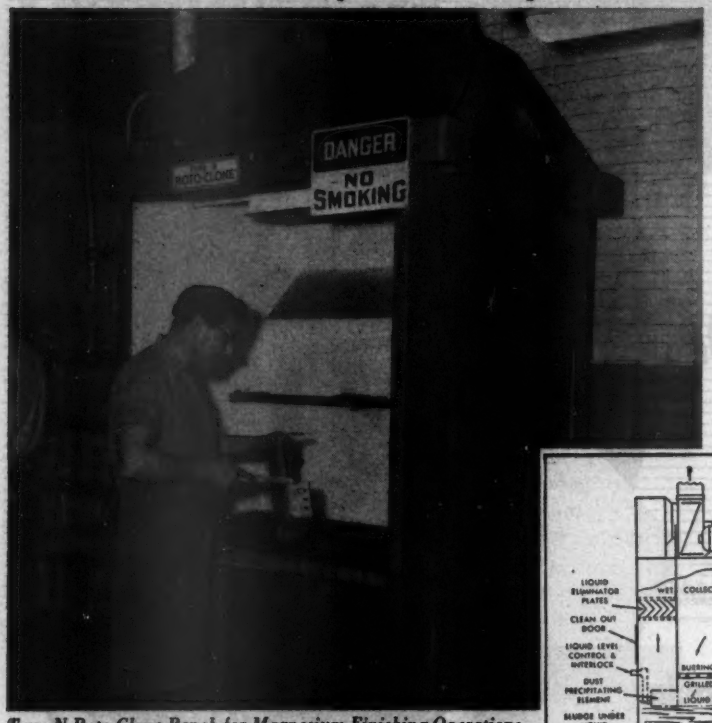
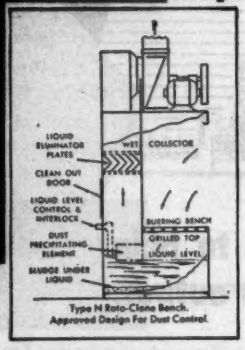


Type N Roto-Clone Bench for Magnesium Finishing Operations. Dictaphone Corporation, Bridgeport, Connecticut



SAFELY EQUIPPED
for light metal finishing

AAF ROTO-CLONE Type N Bench Removes Hazard Of Magnesium Dust at Dictaphone Corp.

The Type N ROTO-CLONE* dynamic precipitator has a remarkable safety record in efficient collection and safe storage of dangerous dust. Developed by AAF engineers for magnesium finishing, this unit or bench type wet-collector has no moving parts, pumps or nozzles, yet maintains the highest efficiency in collecting extreme fines. The Type N ROTO-CLONE immediately removes incendiary dust from the source by passing entrained material through a sinuous water curtain under heavy turbulence . . . induced by the flow of air through a stationary impeller. Dust is stored at once in sludge form within the base of the self-contained unit, and under water for complete safety.

The eleven sizes and three arrangements of Type N meet requirements for all dangerous finishing operations, such as stand grinding, burring, buffing, sawing, etc. Unit design also provides additional safety factors by allowing isolation of operations.

If incendiary dust is one of your problems, call your nearby AAF representative or write for Engineering Bulletin No. 277 A.

**ROTO-CLONE, is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

AAF American Air Filter COMPANY, INC.

361 Central Ave., Louisville 8, Kentucky • In Canada: Darling Bros., Ltd., Montreal, P. Q.

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Begins on page 139

Flooring

23 This 8-page catalog describes "Plastic Rock" floor surfacing material which can be applied over concrete, wood, or steel. Gives available grades of material, tells how to select the grade for any application. United Laboratories, Inc.

MATERIALS HANDLING

Packaging

24 This 20-page booklet covers the methods of corrosion-resistant packaging for export shipment. Picture sequences show cleaning and degreasing of metal parts, application of rust preventives, correct wrapping, sealing, and application of carton overwrap. Dearborn Chemical Co.

Air Cylinders

25 Describes 28 models of air cylinders for lifting and pressing applications. Working drawing and specs for each model and size cylinder. All information on a particular model is on one page, for handy layout of circuits. Rivett Lathe & Grinder, Inc.

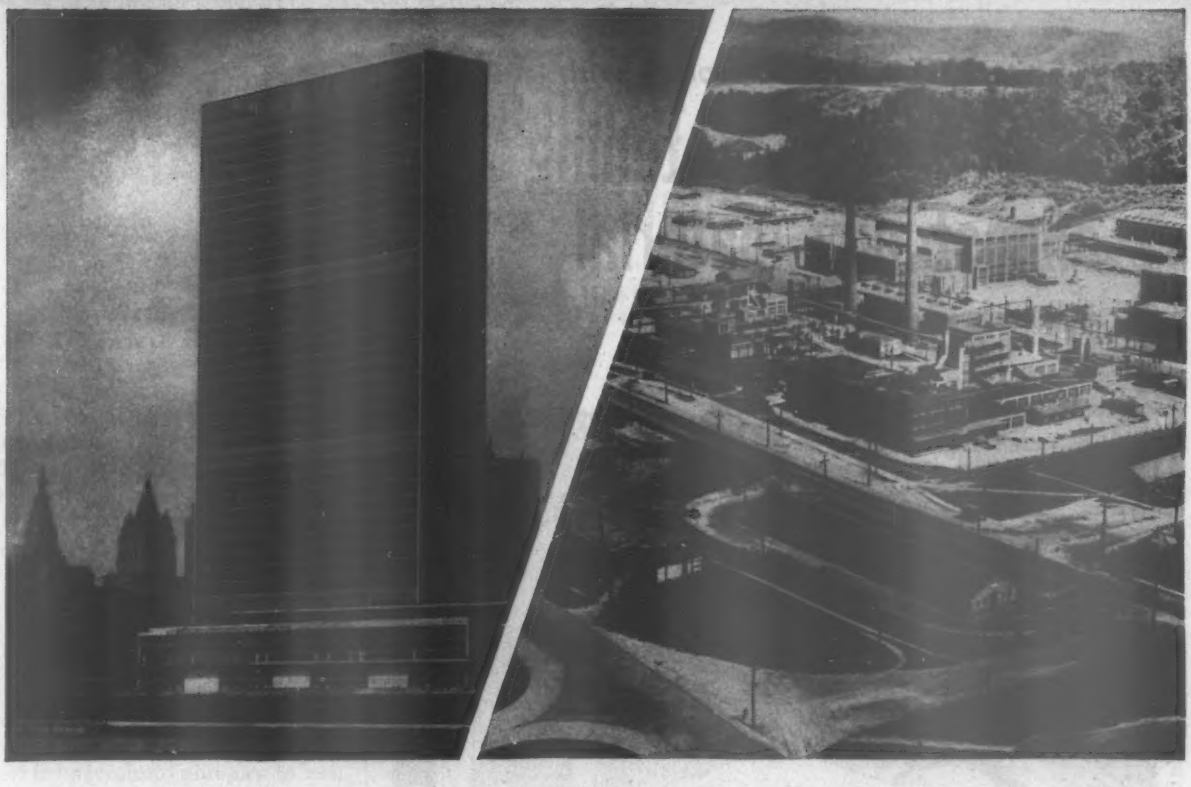
Fork Trucks

26 Fork trucks, in capacities of 3000, 4000, and 6000 pounds, are shown in this 8-page catalog. Contains dimensioned drawings which show the maneuverability of the trucks, detailed specifications. Baker-Raulang Co.

Steel Strapping

27 Steel strapping tensioning tools, seals, and sealing tools are illustrated and described in this bulletin. Lists available sizes of tools, shows construction features. Gives dimensions of strapping, tensile strength of each. Allegheny Steel Band Co.

Turn the page



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Speed of installation . . .

Dependability of performance.

These are the reasons why the builders of Oak Ridge . . . like the builders of The United Nations' new headquarters . . . so often used Trumbull products for distributing and controlling electric power.

In the apartment houses and schools, for example, they used Trumbull load centers equipped with automatic circuit breakers. And in the Atomic Energy Commission plants, they used Trumbull switchboards and motor control centers.

MORE NEWS FROM TRUMBULL

Since the building of Oak Ridge, Trumbull has developed many new products of the same types.

Trumbull's new load center—called Trumbullite—is the first to have plug-in circuit breakers with quick-make, quick-break operation.

And Trumbull's motor control centers are now in the form of CENTR-A-POWER, in which standardized starter-and-disconnect units are grouped in prefabricated, rigid steel troughs, in any arrangement.

What better testimony to product acceptance . . . than to have it adopted where, for peace or war, the atomic energy plant was built . . . and where, for peace, The United Nations is erecting its permanent headquarters?

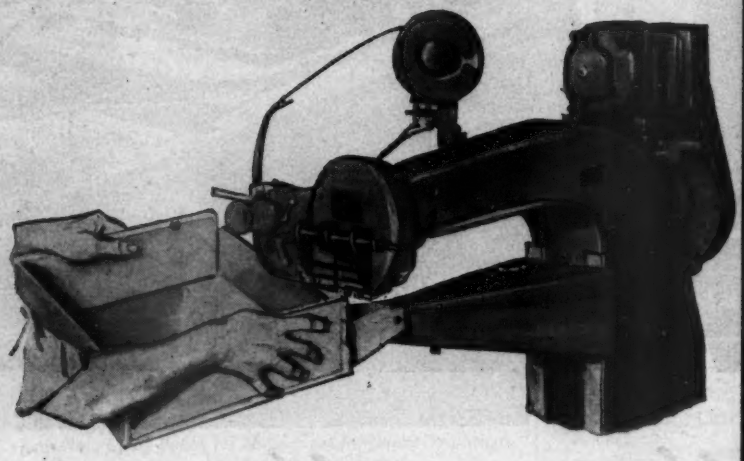
TRUMBULL (T) ELECTRIC

DEPARTMENT OF GENERAL ELECTRIC COMPANY

PLAINVILLE, CONN.

How to save time and money with

new way of fastening almost any material to various metals



"A penny saved is two pence clear."

—Ben Franklin's Almanac, 1757

Today there's no need to take fastening or assembly costs for granted.

In many cases you can do away with expensive rivets, screws, nails, bolts or spot welds to fasten metal either to metal or to other materials.

You can do the same job—and do it both faster and better—with an Acme-Morrison Metal Stitcher.

You can stitch various combinations of steel, brass, copper or aluminum to each other or to such materials as wood, felt, cork, canvas, leather, rubber, fibre, plastic, asbestos—there are too many combinations to mention them all.

Many manufacturers have checked with us and found that Metal Stitching saves them materials and labor costs, speeds assembly time, and improves their finished products.

Surely it's worth looking into! Just send in the coupon below for your free copy of our new 12-page booklet!

ACME STEEL COMPANY
2840 Archer Avenue, Chicago 8, Illinois
Steel Strapping — Stitching Machines and Wire
Venetian Blind Slat Stock — Corrugated Fasteners — Strip Steel

ACME STEEL

FREE

ACME STEEL COMPANY, Dept. FM-101
2840 Archer Avenue, Chicago 8, Illinois

Please send me a free copy of your new booklet, "Metal Stitching—a new technique in fastening."

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COMPANY_____

STREET ADDRESS_____

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NEW Free CATALOGS

To get them, use the coupon on page 139 or page 330.

Begins on page 139

Hydraulic Lift Trucks

28 This 16-page bulletin describes two models of hydraulic lift trucks, designed for one-man handling of pallet loads. Available in capacities up to 6000 pounds. Features diagrammed sections on palletized car loading, pallet design. Barrett-Cravens Co.

Creped Cellulose Wadding

29 An 8-page booklet of recommendations for the use of creped cellulose wadding in military packaging. Uses easy-to-read tables to give type and thickness of wadding recommended for various application and shipment conditions. Photos of typical jobs. Kimberly-Clark Corp.

Constant Delivery Pumps

30 Describes and illustrates three constant delivery axial piston pumps suitable for heavy-duty pushing, pulling, lifting, and lowering; and for maintaining high static loads on clamping rams. Full specifications, dimensioned drawings, oil circuit diagram. The Oilgear Co.

Belt Conveyor Idlers

31 Describes self-aligning idlers, steep-angle troughed belt idlers, belt conveyor trippers, take-ups, cleaners. Each is described, full specifications given. Section on correct maintenance of each unit, including lubrication specs. Chain Belt Co.

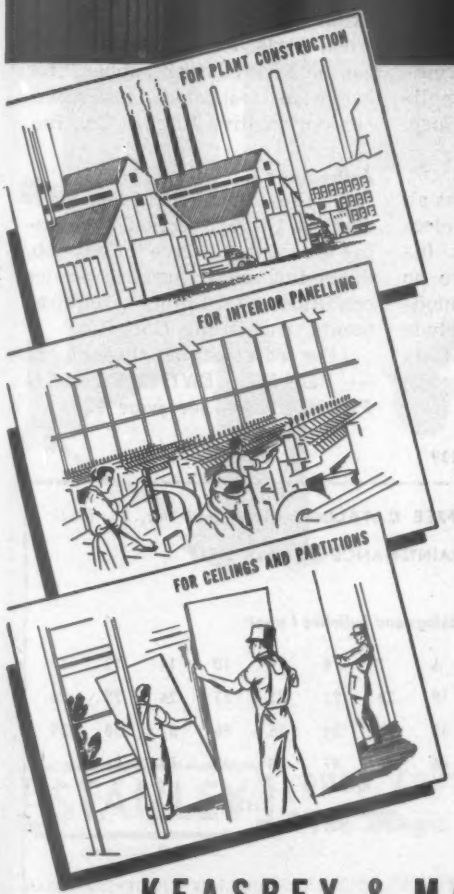
Electric Car Puller

32 This 8-pager describes electric car pullers, lists many suggested uses for the units. Available in several types: capstan, drum, continuous rope. Full specs and photo of each. Section on selecting best car puller for any application. American Hoist & Derrick Co.

Turn the page

Build it quickly ... economically with "Century"® APAC

Track-side building with both exterior and interior walls of "Century" APAC



Whatever your construction plans—interior, exterior, new structures, or modernization—you'll build better, at less cost, with "Century" APAC . . . Keasbey & Mattison's versatile asbestos-cement structural sheet.

Consider the advantages of building with APAC: It's a low-cost material of stone-like durability. Application is quick and inexpensive: Sheets are large size (standard 4′ x 8′); are easily cut and fitted on the job; can be fastened with ordinary nails or screws. Labor costs are low.

And APAC needs but a minimum of maintenance! The all-mineral asbestos and cement composition resists weather and moisture—*can't burn*—is unaffected by rodents or termites and will not rust or rot. The attractive natural gray surface never needs protective painting!

These are just a few of the many reasons why so many plants are using "Century" APAC for siding, office panelling, fire-resistant sheathing in shops and stock-rooms, storage bins, linings for elevator casings, shower stalls —to name but a few uses. We'll be glad to send you complete information on "Century" APAC, and the name of your nearest distributor. Write us.

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

K&M best in asbestos

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

NOW CLEAN GENERATORS MOTORS Without Solvents

NO Drying Period Toxic Hazards

with New Pangborn AC-4 Blast Machine

NOW YOU CAN clean electric motors, generators and turbines *without solvents!* The new Pangborn AC-4 Blast Machine scours armatures, parts, frames, coils, etc. with soft (20-mesh) corncob grits.

Since no liquids are used there is no need for drying periods and toxic or explosive hazards are eliminated. Large equipment can be cleaned *in place* and no residue is left to create gum or to break down insulation.

Simple and Inexpensive

New Pangborn AC-4 Blast Machines operate from a standard 40-pound air supply. Material costs average 1/10 of other methods and complete cleaning is finished in half the time.

FOR DETAILS, write today outlining your operation. Address: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the Latest Developments in Blast Cleaning and Dust Control Equipment

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

IMPORTANT NEW Free CATALOGS

To get them, use the coupon below — or the duplicate on page 139.

Begins on page 139

MISCELLANEOUS

Metallizing Gun

33 Describes metallizing process and its use in resisting corrosion, rebuilding worn parts, reclaiming mis-machined parts. Gives capacities (in pounds of metal deposited per hour), operation, specifications. Photos show typical metallizing operations. Metallizing Company of America.

Foamglas Insulation

34 Foamglas thermal insulation for piping and process equipment is described in this 24-pager. Discusses advantages of product; lists properties, heat transfer data. Tables of recommended thickness for any application. Pittsburgh Corning Corp.

Drinking Water Coolers

35 An 8-page folder shows all models in this line of electric drinking water coolers. Includes coolers which require no plumbing installation, other models up to 20-gal. capacity include an explosion-proof model. Cutaway drawings show construction features. Ebco Mfg. Co.

Business Forms

36 Business forms of all types —495 of them—are illustrated in this 65-page catalog. Gives complete data and price on each. Also shows a line of ring binders, post binders, storage cases, vertical files, and clip boards. Well-indexed. Horder's Inc.

Rubber-Coated Equipment

37 This 12-page catalog shows some of the rubber-coated parts and equipment produced by this company. Pictures rubber-lined tanks and pressure vessels, exhaust systems, pipe, small electrical parts. Its claim: "anything can be covered with rubber," for corrosion resistance, insulation, etc. Automotive Rubber Co., Inc.

Adhesives

38 Feature of this 34-pager is a 15-page section on choosing the right adhesive for any job, depending on materials, service conditions, assembly requirements. Armstrong Cork Co.

(For catalogs 39 through 51 — PLANT ENGINEERING PROBLEMS — see page 276)

DUPLICATE COUPON ON PAGE 139

MAIL THIS COUPON FOR FREE CATALOGS *(Good until Dec. 31, 1951)*

FACTORY MANAGEMENT & MAINTENANCE (October, 1951)
330 W. 42nd St., New York 18

I'm circling the numbers of the catalogs and bulletins I want:

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49	50	51	

NAME ..... TITLE .....

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"Non-stop" MAGIC

. . . saves handling time and costs

No stops are needed to open and close doors when Stanley Magic Door Controls are installed.

Like Magic, the ever-watchful photoelectric "eyes" of Stanley Magic Door Controls see traffic approaching . . . automatically open the door. After all traffic has passed, close it quickly, safely. Traffic is speeded, damage to doors and trucks is eliminated — air-conditioning, humidity and heat control improved, all-'round operating efficiency increased.

Handling costs are an important part of the total cost of your products. One good way to lower handling costs is with *completely automatic door control* — Stanley Magic Doors.

Stanley Magic Doors have made important savings in many types of industrial plants, and can do the same for you. Easily adapted to almost any requirement of space and location, they can be installed on your present doors. Mail this coupon.

STANLEY DOOR CONTROLS *"The Magic Door"*

Reg. U.S. Pat. Off.

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

COMPLETELY AUTOMATIC DOOR CONTROLS FOR SWINGING, SLIDING OR FOLDING DOORS

THE STANLEY WORKS, Magic Door Division
300 Lake Street, New Britain, Conn.

☐ Kindly send me full information on Stanley Magic Doors.
☐ Please have your representative call.

Your name .....

Firm's name .....

Street .....

City ..... *State* .....

no worry and fear... no costly down time here

Management and workers alike know their plant is safeguarded from fire. No chance of a short circuit, a stray spark, a forgotten cigarette or spontaneous combustion starting a raging fire that could cut into vital production time, endanger the lives of employees or damage hard-to-get equipment, thanks to efficient, quick-acting C-O-TWO Fire Protection Equipment.

You too, can have this same secure feeling . . . this same positive protection from costly fires by installing complete, approved C-O-TWO Fire Protection Equipment. For example, the new C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing Systems keynote flexibility to meet your particular fire protection needs. Flammable liquids, electrical equipment, storage and manufacturing processes can all be made firesafe from a single low pressure carbon dioxide storage tank . . . capacities range from one to fifty tons of fire-killing carbon dioxide. If fire should strike . . . fast, clean, non-damaging, non-conducting carbon dioxide extinguishes the blaze in seconds . . . no water damage, no after fire mess.

Further, when a C-O-TWO Smoke or Heat Fire Detecting System is used in combination with a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System, the first trace of smoke or spark of fire in a protected area immediately sounds an alarm . . . then the fire quenching carbon dioxide is readily released into the threatened area.

So, whatever your fire protection problem, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today . . . tell us about your particular fire hazards. Our experience is at your disposal . . . no obligation of course.

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

Keller Hoist handles ladles of hot iron in a foundry

KELLER AIR HOIST for LOW MAINTENANCE

There is so little to go wrong with an air motor that Keller Air Hoists are establishing remarkable records for low-cost maintenance. For example, an air motor will not burn out when overloaded. It is uninjured by prolonged stalling.

That is one of the reasons why Keller Air Hoists are preferred over other types for hundreds of industrial uses.

Other reasons include light weight (30 lb*), small size (5″ x 5″ x 15″*), accurate control (speed variable from a creep to 17fpm*), and safety. *For 1000-lb Hoist. Capacities of 300 and 2000 lb also available.

Air Hose Trolley

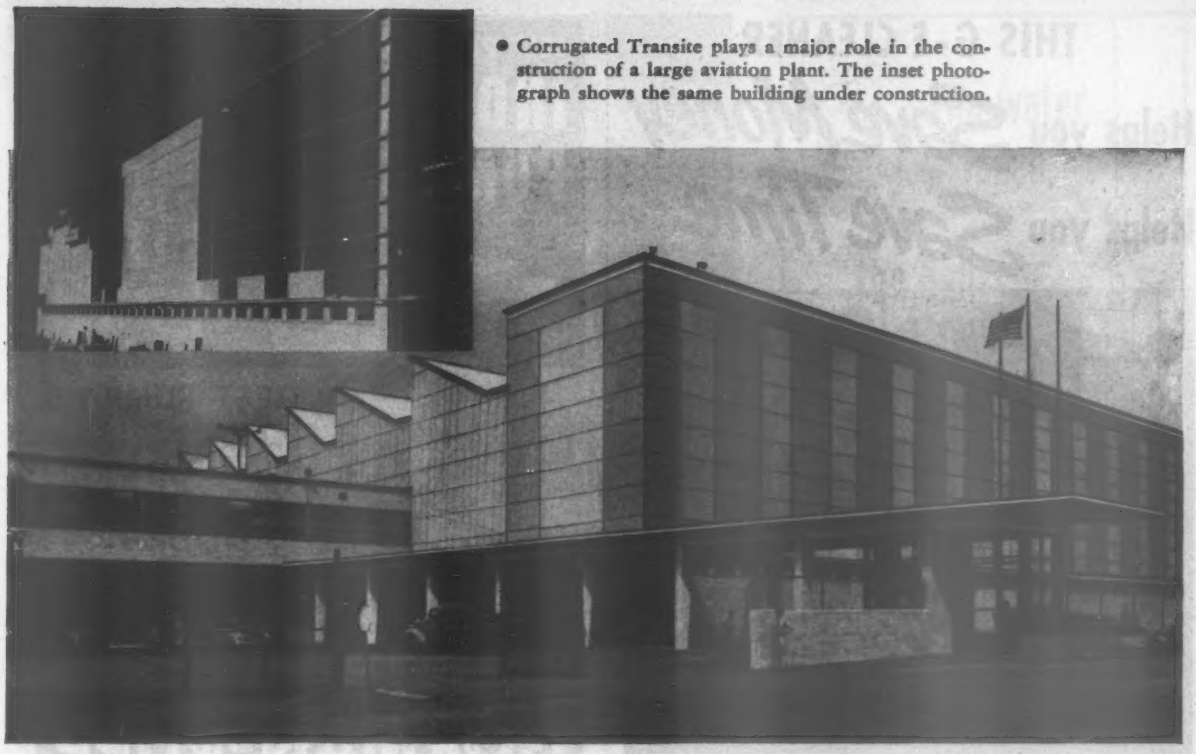
Keeps air hose conveniently suspended, permitting it to follow a trolley-suspended Keller Air Hoist.

Keller Air Hoists, Hoist Trolleys, and Hose Trolleys are available through Keller sales offices, or direct from the factory.

KELLER

Pneumatic Tools

KELLER TOOL CO., GRAND HAVEN, MICH.



● Corrugated Transite plays a major role in the construction of a large aviation plant. The inset photograph shows the same building under construction.

CORRUGATED TRANSITE* *For expansion in essential industries*

*Transite is a registered Johns-Manville trade mark

Because it goes up fast . . . requires a minimum of framing . . . Johns-Manville Corrugated Transite, the large asbestos building sheet, is ideal for defense construction.

Made of two practically indestructible materials, asbestos and cement, Corrugated Transite is fireproof, rotproof, and rustproof. The large, easy-to-handle sheets with their unusual strength provide durable, weatherproof walls and roofs.

With a minimum of framing required, sheets of Corrugated Transite are quickly and easily applied . . . construction costs are greatly reduced. When conversion or expansion is necessary, these sheets can be salvaged and re-used.

The natural stone-gray color of Transite is attractive without further decoration—it never needs preservative treatment. This modern building sheet with its streamlined corrugations and attractive shadow lines has great architectural appeal and is being increasingly used—inside as well as out.

If you're planning construction that you want to build fast, look well, last long—investigate Johns-Manville Corrugated Transite! For full details write Johns-Manville, Box 158, Dept. F-10, New York 16, N. Y. In Canada, write 199 Bay Street, Toronto 1, Ontario.

EASY TO FASTEN TO STEEL

EASY TO SAW

EASY TO DRILL

EASY TO NAIL TO WOOD

Johns-Manville *Asbestos* CORRUGATED TRANSITE

THIS G-E CLEANER

Helps you *Save Money*

Helps you *Save Time*

THESE modern, G-E Heavy-duty Cleaners have many special features:

- They help you cut cleaning time . . . a sure way to cut maintenance costs.
- They switch quickly and easily from wet to dry pickup . . . powerful motors pick up mop water, dust, coarse litter with equal ease.
- They have extra-wide nozzles to cut the cleaning time of larger areas.
- They convert in a moment to *powerful blowers* for quick gathering of scrap into convenient piles for salvage or disposal.
- They have special attachments for cleaning high, hard-to-reach areas thoroughly and quickly.

These are but a few of the features that make G-E industrial cleaning equipment so productive.

MAIL COUPON FOR DETAILS

Heavy-Duty Cleaning Equipment

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, Dept. 22-1327
1285 Boston Ave., Bridgeport 2, Conn.

Without obligation, please send complete details on heavy-duty cleaning equipment.

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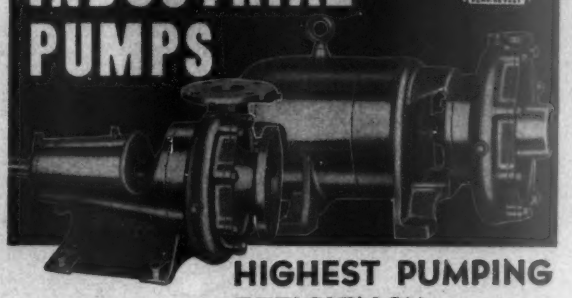
SELF-PRIMING CENTRIFUGAL

INDUSTRIAL PUMPS



HIGHEST PUMPING EFFICIENCY . . . . .

Combines all the advantages of exact hydraulic engineering with the best mechanical design. Available in bronze fitted, all iron and all bronze construction.

Alta Pumps - Serving a capacity head-range up to 1000 g.p.m. and 200 ft. head with 14 sizes 1 to 4 inches. Practically no end thrust in ball bearings. No high pressure on stuffing box packing. High suction lifts without vibration and cavitation.

Pedestal Pumps - Pedestal is a strong casting suitable for direct connection to a motor or engine through flexible-coupling or heavy duty belt drives.

Write for bulletin 9-IP-11 and 8-IP-11

GORMAN-RUPP

THE GORMAN-RUPP CO., MANSFIELD, OHIO

NESTIER — the brand-new MATERIALS HANDLING BOX

Nestier	gauge	weight	A	B	C	D	E
No. 220	16 ga.	15 lbs.	22⅝"	12½"	7¾"	16¾"	8½"
No. 175	18 ga.	6 lbs.	18⅛"	9⅛"	6⅛"	13⅝"	7"

IT NESTS...IT TIERS

Nested, the ¼" bails prevent jamming or sticking . . . Tiered, bails lock units to form rigid stack. Parts in all boxes visible and accessible from either end.

Write for full details of NesTiers, NesTier racks, monorail carriers and dollies.

We supply a complete engineering service to systematize the handling of small parts.

NESTIER

Metal Specialties Division

THE CHAS. WM. DOEPKE MFG. CO., Inc.

ROSSMOYNE, OHIO

Pick the V-Belt Sheave

which all industry likes best

QD
TRADE MARK

Split hub is clamped to shaft. Heavier taper-bored rim slides easily over tapered hub—no keyway obstruction on cone surface. Positive press fit on shaft. Large, long pull-up bolts also used as jack screws to remove rim.

Here's a 26-word description of the V-belt sheave that is used more than any other.*

Two parts for easy handling—separately or together. Split hub and tapermated rim make mounting easy. No realignment problem—clamped hub stays put while changing rims.

That's Worthington's QD—the original tapered cone-grip sheave that's preferred by men who have to install or change sheaves. The QD is *easy to get on, easy to get off, yet always tight on the shaft* —tighter than any other sheave on the market. Hubs for every bore—lower inventory cost.

For your machines, pick Worthington Multi-V-Drives with QD sheaves and Worthington-Goodyear EC Cord V-belts.

Complete range of stock sizes—prompt shipment from distributors everywhere.

**In addition to being one of the largest-selling sheaves, the popular Worthington QD design is licensed to many other sheave manufacturers. For your protection, dimensions are standardized to permit interchangeability.*

but the distributor "came through"

A hydro-electric plant, crippled by drought, was threatened with losing its franchise; was given 60 hours to bring its service up. Two Diesel engines were about to arrive when somebody remembered to order the V-belt drives.

A call to Anderson-Crane Rubber Company, Worthington distributor in Minneapolis, located four large D-section QD sheaves and 25 Worthington-Goodyear steel cable V-belts. These were rushed by car at night to the power plant, arriving just ahead of the engines. Within 24 hours, the plant was producing full power.

Once again, the Worthington distributor was *on the job*—with the needed supplies and the prompt service!

WORTHINGTON

THE GOOD RIGHT HAND OF INDUSTRY

POWER TRANSMISSION: sheaves, V-belts, variable speed drives

PUMPS: centrifugal, power, rotary, steam

AIR COMPRESSORS: water-cooled, air-cooled

Worthington Pump and Machinery Corporation
Multi-V-Drive Sales Division
Buffalo, New York

Send Bulletin V-1400-B7F on Worthington Multi-V-Drives.

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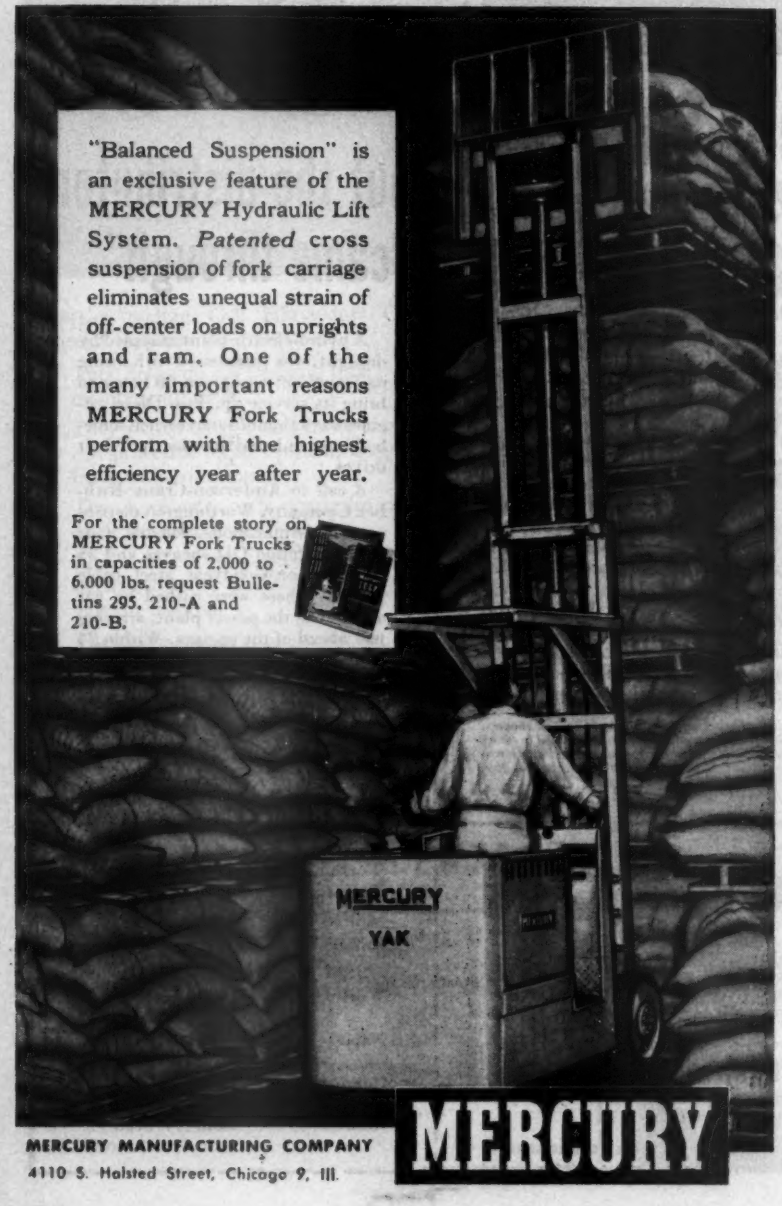
MV.1.3

only **MERCURY** offers

"Balanced Suspension"

Eliminates destructive side force of off-center loads



"Balanced Suspension" is an exclusive feature of the MERCURY Hydraulic Lift System. *Patented* cross suspension of fork carriage eliminates unequal strain of off-center loads on uprights and ram. One of the many important reasons MERCURY Fork Trucks perform with the highest efficiency year after year.

For the complete story on MERCURY Fork Trucks in capacities of 2,000 to 6,000 lbs. request Bulletins 295, 210-A and 210-B.

MERCURY

MERCURY MANUFACTURING COMPANY
4110 S. Halsted Street, Chicago 9, Ill.

Dependable Source of RUBBER COATED INDUSTRIAL FABRICS

For 42 years VULCAN has pioneered in research and development of synthetic and natural rubber coated industrial fabrics.

VULCAN coated fabrics are proving their superior qualities in the automotive, gas, printing, chemical, aircraft, petroleum and many other industries. If you have an application for industrial coated fabrics, or a problem to solve, we invite your inquiry.

Special attention to defense projects.

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Photo by Josef A. Schneider

I agree with you 100%

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That's why Union Pacific's transportation experience works out so well for you. Knowing the needs of shippers in every class of industry is our business. Our freight representatives are ***specialists*** in their field, who can back up what they tell you with facts learned during their years of "on the job training."

There's a U. P. freight man near you. Depend on him for shipping advice, for prompt deliveries, ***for every bit of service your shipping dollar entitles you to!***

• • •

Need passenger reservations? All departments of Union Pacific work closely together. The representative you know will be glad to help you with your travel plans.

Be Specific – Ship "Union Pacific"

(Offices in 70 cities throughout the U.S.A.)

SLASH MAINTENANCE PAINTING COSTS...

UP TO 40%

Enterprise
STAIZE-CLENE
THE NEW MIRACLE DIRT REPELLING DISCOVERY

World's Only Paint Made With Patented **SYNCON***

*Made Under U. S. Patent No. 2,353,910

- **Gives walls and ceilings 2 to 3 years of extra service — stays clean from 79% to 90% longer**
- **Lipstick, machine grease, merchurochrome and ink washes off without leaving a single trace of stain**
- **Calibrated colors — Da-Lite and Eye-Rest colors "rated" for light reflective values**
- **Complete line of Flat Enamel, Semi-Gloss Enamel and High-Gloss Enamel finishes — also Enamel Undercoater and Pigmented Primer Sealer**

Compare the advantages STAIZE-CLENE gives you over any other paint. Weigh its dirt resistant qualities —note its better coverage—the fact that it goes farther —consider its high resistance to fumes—this will tell you why STAIZE-CLENE with Syncon has been hailed as the greatest improvement in paint in the last 20 years!

Send for the FREE STAIZE-CLENE Manual—"How You Can Reduce Your Maintenance Painting Cost," and learn how you can make substantial savings with this unbeatable maintenance finish.

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Please send me the FREE Manual—"How You Can Reduce Your Maintenance Painting Cost."

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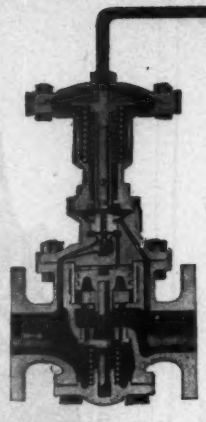

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REDUCING VALVE

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CLASS LT-3
REMOTELY ADJUSTED REDUCING VALVE with
AIR LOADING PANEL

An ideal combination for Steam Heating Systems where valves are inaccessible for re-adjustments. Avoids wasteful overheating. Saves time and eliminates safety hazards.

Write for Bulletin 461

TYPE ARP
Air Loading Panel

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ESTABLISHED 1900 LESLIE CO.

PRESSURE REDUCING VALVES • PRESSURE CONTROLLERS
FLOATLESS LEVEL CONTROLS • PUMP GOVERNORS
TEMPERATURE REGULATORS • SELF CLEANING STRAINERS
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TAC does what no other tool can do!

AT LAST! AN OPEN-END RATCHET WRENCH — the world's first true universal wrench. A patented design for connections on tubing, rods, piping, conduit, studs, etc. Sixty-four socket sizes from ⅜" to 4". Smallest effective ratcheting arc yet — 5° to 7½°. TAC will also do every job any ordinary ratchet wrench will do: one TAC set replaces literally dozens of single-purpose hand tools.

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TAC

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Presenting THE NEW LINE OF HEAVY-DUTY

Milwaukee "SUPER" HOLE-SHOOTERS

★ **NEW** DIE-CAST ALUMINUM HOUSINGS... LIGHTER WEIGHT... PERFECTLY BALANCED

★ **NEW** HELICAL CUT STEEL GEAR TRAINS... MORE POWER... HIGHER TORQUE

★ **NEW — LOWER PRICES**

½"	$59.50
⅝"	$69.50
¾"	$79.50
⅞"	$89.50

POWERED EXCLUSIVELY BY

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9-POINT MOTORS—FAMOUS FOR MORE "MOTOR GUTS"

READY NOW — Ask for free folder "D-1"

RUGGEDLY built and of simple functional design, these new MILWAUKEE "SUPER" HOLE-SHOOTERS assure unmatched power and new cost-cutting performance for today's production requirements, as well as heavy duty maintenance.

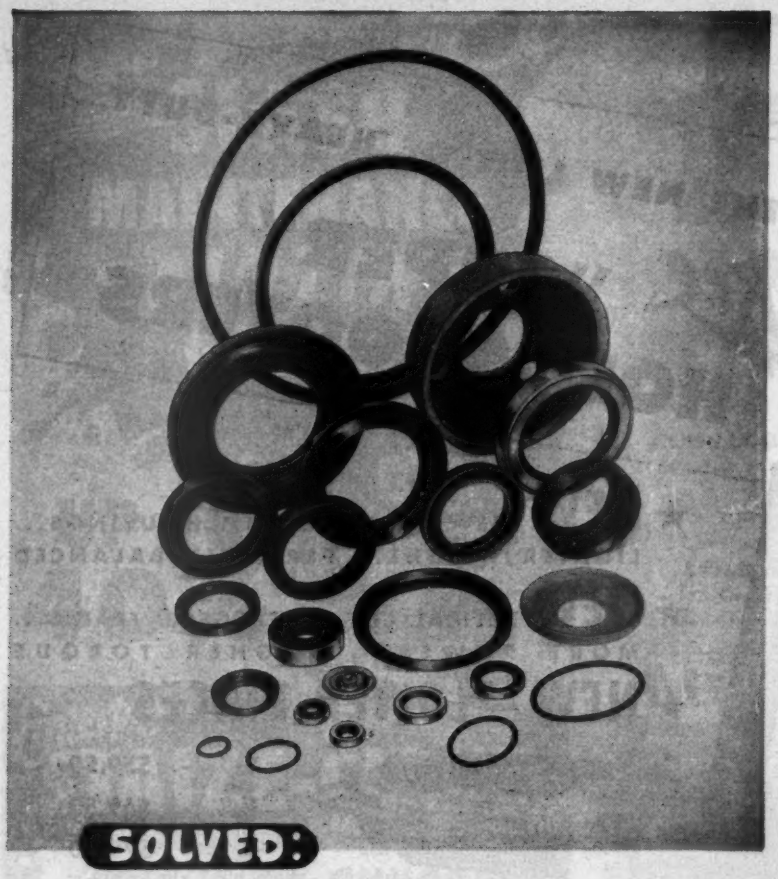
Outstanding advantages of their Milwaukee-Built 9-point motors are — *higher load speeds* in continuous use, *four times* the customary volume of cooling air, *vibration-free* armatures, *unequalled* electrical efficiency, *lifetime lubrication* of ball and roller bearings — a combination of notable features that guarantee longer service-life, more hours of service-free operation, lower operating costs, and dependable heavy-duty performance.

It costs you nothing to get complete information on the many advantages of "SUPER" HOLE-SHOOTERS. Write us today for Folder *"D-1."*

MILWAUKEE ELECTRIC TOOL CORP.

5346 WEST STATE STREET • MILWAUKEE 8, WISCONSIN

Canadian Distributor — MATTHEW MOODY AND SONS CO.
740 Inspector Street, Montreal, Quebec



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How to keep pace with growing demands in Leather and Synthetic Rubber PACKINGS

At G&K-INTERNATIONAL our laboratory, engineering and production staffs have pioneered many developments in mechanical packings, and today are tackling the toughest problems with *experience.*

Co-ordination is the reason for our plus-average in coming up with the right answer.

And because packings problems too often come up when time is critical, you'll benefit by consulting us *now* regarding packings in your business.

For PACKINGS in Grakone (Synthetic) and Leather

IPC

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GRATON & KNIGHT COMPANY
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Since 1851

100 YEARS OF SERVICE TO INDUSTRY

For the Finest Offices

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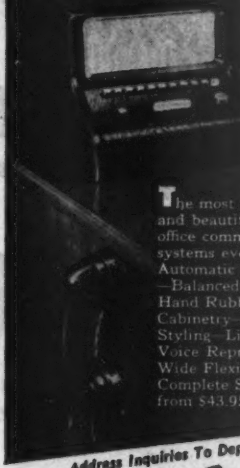

The most versatile and beautiful inter-office communicating systems ever produced. Automatic Busy Signals—Balanced Lines—Hand Rubbed Walnut Cabinetry—Functional Styling—Life-Like Voice Reproduction—Wide Flexibility. Complete Systems from $43.95 list.

Address Inquiries To Dept. G-10

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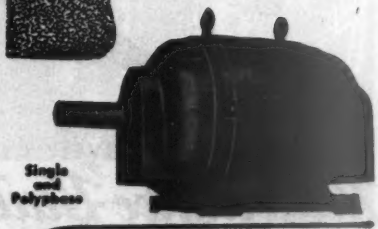

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Fully enclosed Ball Bearings; semi-enclosed construction that protects against dripping and splashing hazards and assures cool, continuous operation. Available in polyphase—from ½ to 60 hp, single phase—from ½ to 5 hp, for wide adaptability of use and greater flexibility in your power planning.

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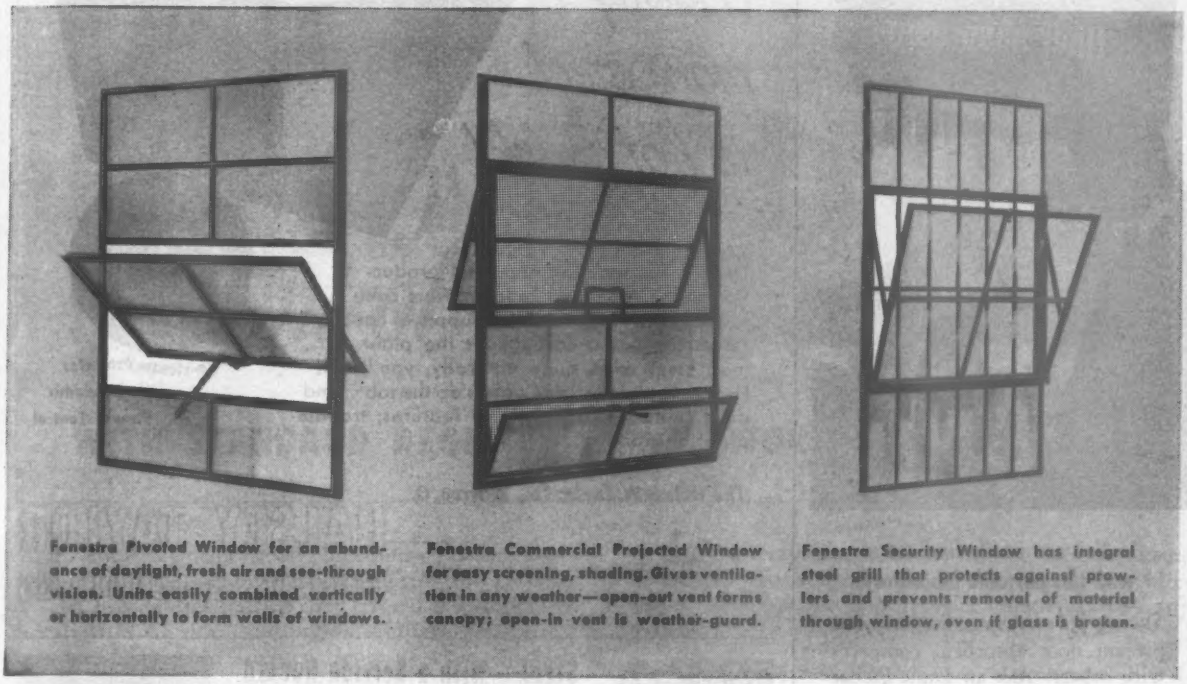
VALLEY

ELECTRIC CORPORATION

4221 FOREST PARK BLVD. • ST. LOUIS 8, MO.

Why These New Super-Galvanized Steel Windows Will Save You Hundreds of Dollars!



Fenestra Pivoted Window for an abundance of daylight, fresh air and see-through vision. Units easily combined vertically or horizontally to form walls of windows.

Fenestra Commercial Projected Window for easy screening, shading. Gives ventilation in any weather—open-out vent forms canopy; open-in vent is weather-guard.

Fenestra Security Window has integral steel grill that protects against prowlers and prevents removal of material through window, even if glass is broken.

You never need to paint them.

They're strong because they are *steel;* they are weather-durable because they're zinc-coat protected.

They will cut your window maintenance to a minimum. So your investment in Fenestra* Hot-Dip Galvanized Steel Windows will pay off year after year for the life of your building.

What makes Fenestra Galvanizing "Super-Galvanizing"? A special plant and a special galvanizing system and special controls..

Fenestra's new plant is the only one in America especially designed and geared to hot-dip galvanize Steel Windows.

Here's what happens:

Once frames are assembled and vents are put together, automatic controls take over . . . moving them along . . . timing every move. From degreasing to pickling to hot and cold rinsing to fluxing and drying go the frames and their vents. Then when finally they are perfect for galvanizing, they dip deep into molten zinc. Then they are Bonderized. Then rinsed again. And with every segment of surface covered by locked-on galvanizing, they go to final assembly of vents in frames . . . then to you.

See them today. Call the Fenestra Representative (He's listed under "Fenestra Building Products Company" in your Yellow Phone Book) or write Detroit Steel Products Co., Dept. FM-10, 2266 East Grand Boulevard, Detroit 11, Michigan. *®

Fenestra

Send for your free book on how Fenestra Super Hot-Dip Galvanizing makes Fenestra Steel Windows *stay* new.

WINDOWS • DOORS • PANELS

engineered to cut the waste out of building

Just how efficient and economical is your present floor absorbent?

You can easily find out with this portable laboratory

Seeing is believing! See how your present floor absorbent compares with others! Ask an Eagle-Picher representative to show you—right in your plant. See how Eagle-Picher Floor Dry actually gives **more coverage, more absorption per dollar!**

Eagle-Picher Floor Dry is chemically inert, noncombustible, insoluble. Its light weight provides highest coverage. Its light color brightens working areas, adds to plant safety.

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Since 1843
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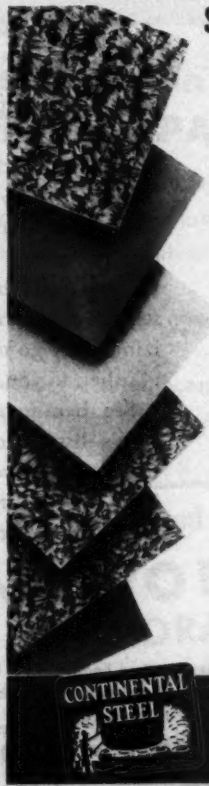
There's one way to keep steel production at the top—and keep workers comfortable—insure a plentiful supply of cool, refreshing water throughout the plant. In most steel mills, quite naturally, you'll find Halsey Taylor Electric Coolers do the job—and do it better! Extra hygienic features, trouble-proof, economical!

Two-stream Projector with Automatic Stream Control

The Halsey W. Taylor Co., Warren, O.

P40

HALSEY TAYLOR
COOLERS & FOUNTAINS



Steel—With a Service Record

CONTINENTAL SHEETS . . .

Hundreds of manufacturers and fabricators are building a better product reputation for their companies with CONTINENTAL sheets. Long on wear, these workable sheets are proving their service value in many ways. CONTINENTAL sheets are supplied in a variety of bases and coatings to meet the exacting needs of industry.

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Constant research in wire product use and in manufacturing has given CONTINENTAL a "wire for wear" reputation. Whether the need is for standard, or for a special shape, CONTINENTAL wire builds a service reputation that wins friends and influences an increasing list of wire customers.

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PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized. KOKOTS, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

Ideas for positive inventory control

Dupli-Card Register system "controls" accuracy of Stock Status

WITH STANDARD REGISTER'S PAPERWORK SIMPLIFICATION

At a New Jersey plant making precision specialties, every issue of parts to assembly is based on a two-copy *Delivery Ticket.* It is an exact carbon copy created as a stock clerk handwrites a *Stock Transaction* tabulating card on a Standard Dupli-Card Register. Hence, as scheduled parts are supplied with one form, accurate perpetual inventory records are concurrently produced for Production Planning through the medium of the other.

This is a feature of one manufacturer's system of smoothing the flow of materials to assembly departments —described in *Paperwork Simplification* No. 20.* This and other issues of our unique magazine may provide other ideas you can use.

Today our representatives are helping their customers re-examine record systems in the light of new requirements. Here are the improvement objectives, with any system:

A. *Develop the best procedure*

B. *Simplify the writing process*

C. *Design the most efficient form*

These are the *three* avenues for complete analysis of any record system problem—the A, B, C way to real paperwork simplification for better control, for maximum savings of time and of manpower.

*** PS. Ideas Available.** Send for recent issues of *Paperwork Simplification* free; no obligation.

Standard Register

Kant-Slip, the original marginally punched

Continuous Forms

Simplify record writing

FORM-FLOW REGISTERS • THE REGISTRATOR PLATEN

Offices in all principal cities

MAIL THIS TODAY!

The Standard Register Company
310 Campbell Street, Dayton 1, Ohio
Please send, without obligation, recent issues of your magazine "Paperwork Simplification."

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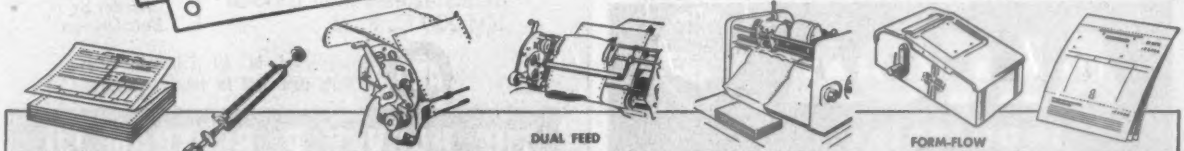


KANT-SLIP continuous forms

Feeding-aligning devices: THE REGISTRATOR PLATEN

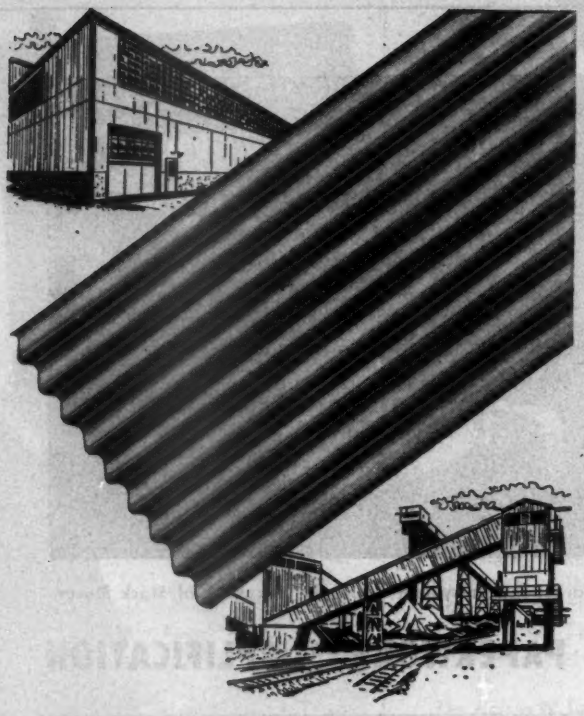
AUTOMATIC LINE FINDER Advances form into new writing position in one motion

DUAL FEED Registers 2 *different* forms for 1 continuous typing operation

BURSTER-IMPRINTERS Sign, date, number, trim, tear off, stack Kant-Slip forms

FORM-FLOW REGISTERS Better records . . . by hand

UNIT ZIPSET FORMS Carbon interleaved



FAST Construction
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All the facts you need to design and erect buildings using Alcoa Industrial Building Sheet have been assembled in this new book. Loading tables, application details and accessory lists, show you how you can save erection time and maintenance costs.

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—*for* LIGHTING

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40-F

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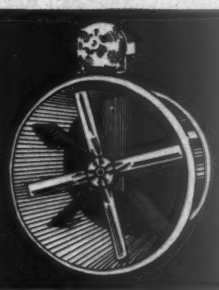
ARE YOU FUMING OVER FUMES?



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BELT DRIVEN DUCT FANS. For spray booths, volatile or explosive fumes, excessive temperatures, dust or any operation requiring the motor to be out of the air stream.

JOB fitted DUCT FANS in sizes from 14" to 72" in diameter and from 1000 to 100,000 C. F. M.

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Roof Ventilators

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Direct or Belt Driven

AIR

Represented in All Principal Cities
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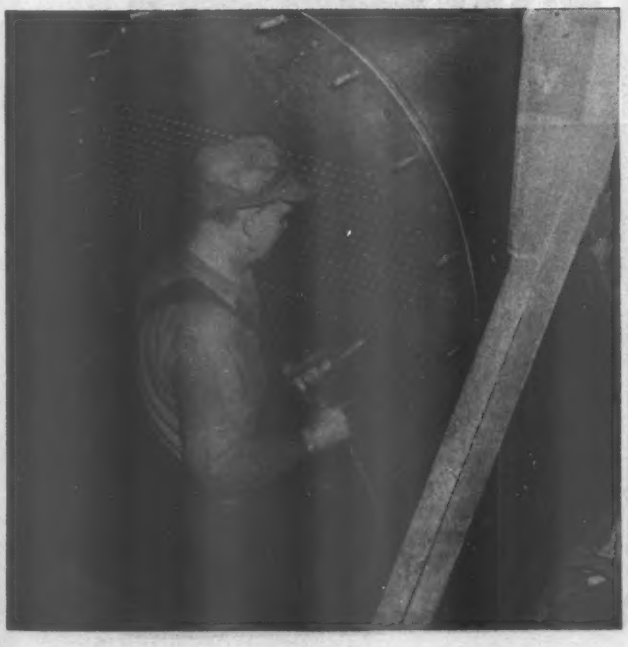
THE HARVEY P. BERTRAM CO.
1008 W. Ninth St. Cincinnati, Ohio

CP-3440 AIR IMPACT WRENCH

saving 60% of nut-running time



The packing nuts of this condenser are being run to uniform tightness because of the power regulator of the CP-3440 REVERSIBLE AIR IMPACT WRENCH. This control of tightness also adapts the CP-3440 for assembly line work anywhere.

On this particular job the CP-3440 is saving approximately 60% of the time required when a T hand wrench was used — and operator fatigue is eliminated.

Less than six inches long, the CP-3440 works where longer tools cannot be used, and weighs but 4½ pounds.

The complete line of CP AIR IMPACT WRENCHES meets every demand for tightening or removing nuts and bolts, driving and removing wood and lag screws, driving and removing studs, and for tapping, in all kinds of maintenance work. *Write for Bulletin 812.*

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PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

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Today's faster business pace makes one fact clear. In many plants and offices the regular exterior telephone system is not enough! It may actually be a bottleneck! Kellogg SELECT-O-PHONE breaks that bottleneck!

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- **IMPROVE EFFICIENCY**
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Automatic, requiring no operator and independent of your switchboard, SELECT-O-PHONE is the modern means of transmitting orders, of exchanging ideas with individual executives or groups *inside* your business!

GET THE FACTS

Many of the greatest names in commerce and industry are already using SELECT-O-PHONE! For complete information, send coupon today to:

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THE *INSIDE* VOICE OF BUSINESS

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Please rush data explaining how I can save hours and dollars with SELECT-O-PHONE.

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FOILED AGAIN!

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Eligible under NPA Regulations $2 and $4.

Made in 5 models. *Illustrated:* Model "HP" with 2-speed control.

Save TIME • MONEY

Keep equipment clean... Prevent damage to machinery with a

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ALLIGATOR V-BELT FASTENERS

● Alligator V-Belt Fasteners and open-end (long length) V-belting in rolls will enable you to make up multiple V-belt drives for a wide variety of applications.

Available for B, C and D sizes of V-belting.

Not to be used for repairing endless cord V-belts.

Bulletin V-211 will give you complete details. A copy mailed on request.

Order from your supply house

FLEXIBLE STEEL LACING COMPANY
4678 Lexington St., Chicago 44, Illinois

Also sole manufacturers of Alligator Steel Belt Lacing for flat conveyor and transmission belts and FLEXCO Belt Fasteners and Rip Plates for fastening and repairing conveyor belts.

"Those blanks aren't scrap... they're saleable steel", agreed Norm

Waste is something Norm can't stand. The same goes for Tom Brinker, manufacturer of portable welding units and a long-time Inland customer. "Every time you form a lamination for your welder," Norm observed, "you leave a 4 x 7 inch piece of 22 gauge electrical sheet steel that you can't use. Why not let us find you a customer for those blanks?"

Norman Grant is an Inland Steel sales representative. His experience told him that those 4″ x 7″ blanks had more than scrap value. Especially at a time when steel is in such great demand. With his trade contacts, Norm was sure he could find a buyer.

A few days later, on his way to visit another Inland customer, Norm had almost driven past the plant of an outboard motor manufacturer when he got a flash . . . "motors!" He stopped. Sure enough, that manufacturer had a pressing need for steel for his magnetos . . . and 4″ x 7″ was a perfect size.

Result: An Inland customer's profit was augmented by the sale of otherwise waste blanks and a motor manufacturer got steel he sorely needed. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

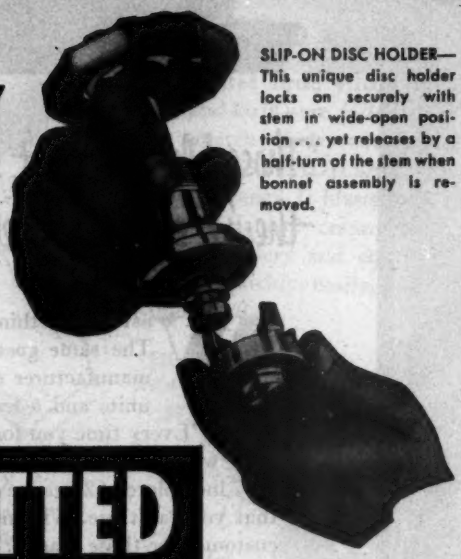
Your scrap is needed by the steel industry for national defense.

Names used are fictitious.

Making your steel is only part of our job.

KENNEDY

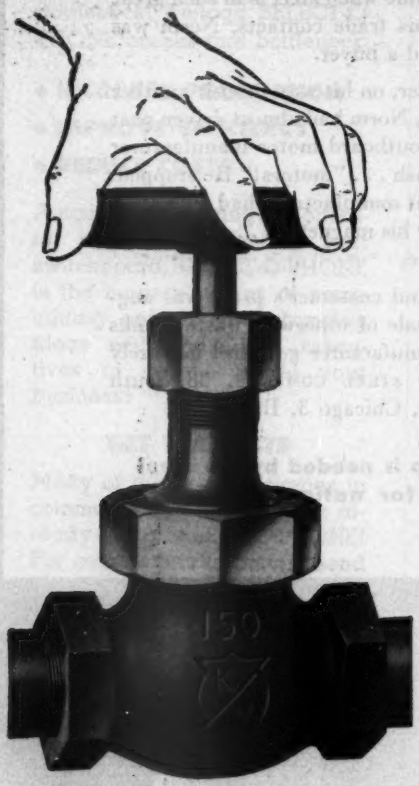
bronze globe valves...



SLIP-ON DISC HOLDER—This unique disc holder locks on securely with stem in wide-open position . . . yet releases by a half-turn of the stem when bonnet assembly is removed.

JOB-FITTED

for longer service, easier maintenance



KENNEDY Fig. 89, Bronze Globe Valve 150 lbs. steam, 300 lbs. WOG, non-shock

YOU KEEP MAINTENANCE COSTS DOWN with KENNEDY Bronze Valves because they are *job-fitted*—every valve specially designed and engineered for the job it has to do.

THE KENNEDY FIG. 89, for example, is designed for services where frequent inspection, cleaning of internal parts and quick renewal of the composition disc are required.

HEAVY UNION BONNET RING permits easy dismantling and reassembly of the valve without risk of damage to body-bonnet bearing surfaces.

RENEWABLE COMPOSITION DISCS are available in a variety of materials to meet a wide range of fluid, pressure and temperature requirements.

RUGGED BODY has an unusually high seat to prolong disc life by utilizing full thickness of disc before disc-holder strikes the base of the raised seat.

LONG-WEARING PACKING—molded rings of lubricated asbestos—maintains easy operation and tight seal to prevent leaks. Valve can be repacked under pressure.

FOR BEST RESULTS and real economy, standardize on KENNEDY Bronze Valves . . . and the complete line of KENNEDY Iron Valves, Malleable, Cast-Iron and Bronze Pipe Fittings.

Write for Circular 101—Buy from Your Local Distributor

THE KENNEDY VALVE MFG. CO. • ELMIRA, N.Y.

Est. 1877

VALVES • PIPE FITTINGS • FIRE HYDRANTS

THE *Jacques* SEMI-AUTOMATIC

POWER SHEAR

For the quick, accurate cutting of materials from rolls or sheets with hand or electronic controls.

Write today for new descriptive folder showing features and applications.

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Manufacturers of:

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STOPALL

is *Guaranteed*

to WATERPROOF MASONRY

A Boon to Contractors and Factory Maintenance Engineers!

All water penetration problems, both above and below grade, have at last been solved, permanently and completely, at a low cost by the new "Miracle Discovery"—STOPALL.

STOPALL has been given laboratory tests equivalent to 12-15 years of actual use under normal conditions. STOPALL embodies the famous General Electric Silicone—the "Miracle Discovery of the Age."

We guarantee that STOPALL is the perfect water repellent for Stone, Stucco, Brick, Cement—in fact all natural and synthetic Masonry, both above and below grade. It is a clear, transparent liquid, slightly heavier than water, and *extremely easy to apply at any temperature.* It penetrates and at the same time permits breathing. It stops efflorescence, and becomes part of the masonry itself.

STOPALL is available in most Paint and Hardware Stores, or write direct to us for special industrial volume discounts. Complete information sent free. NOTE: A few Distributorships available.

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WITH **VEELOS** THE ADJUSTABLE V-BELT

You Always have the Right Size Belt When You Need It!

When endless v-belts fail and your stockroom does not have the size you need . . . that means loss of time and production. But if you're wise and have Veelos, the adjustable v-belt, in stock, this can't happen to you.

With Veelos, *any size* v-belt can be made up right from a single reel. Just four reels of Veelos in the O, A, B and C widths can replace up to *316* sizes of endless v-belts on any drive in your plant. If your machines call for only one or two widths, you stock only those reels of Veelos and *you always have the right size belt when you need it.*

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***For full production, always*— standardize on Veelos, the adjustable v-belt. Write for your copy of the VEELOS DATA BOOK today.**

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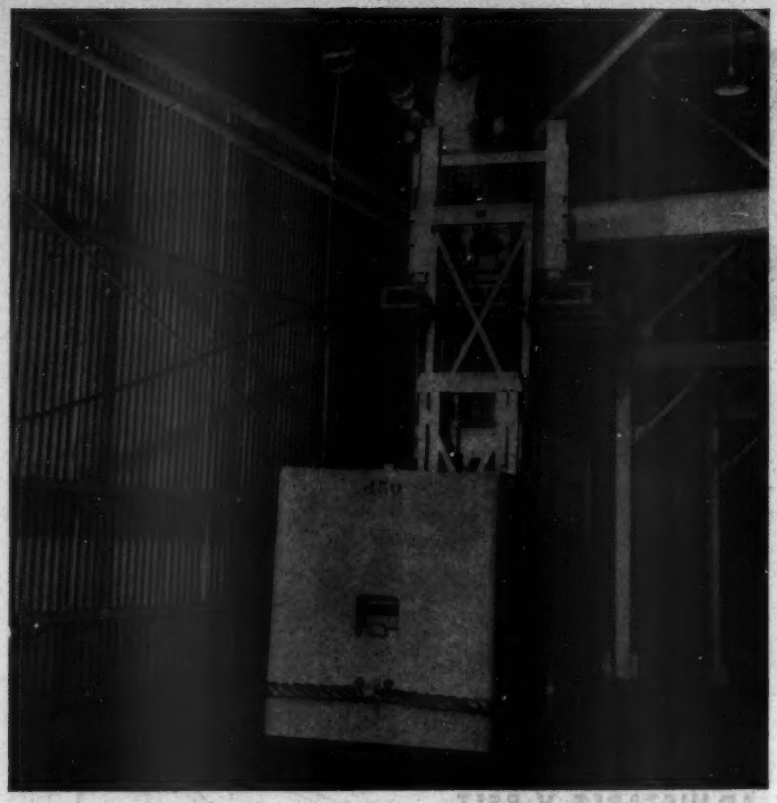
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

MANHEIM MANUFACTURING & BELTING COMPANY • MANHEIM, PA.



Material Handling plus Maintenance

This industrial truck, regularly employed for handling material in unit loads of 2000 to 4000 pounds, serves also to save time on many kinds of plant-maintenance jobs.

It is powered by a 28-cell D8 EDISON Nickel-Iron-Alkaline Storage Battery assembled in a demountable steel box, rated capacity 20.16 kwhr, which has been found ample for full-shift truck operation. Exchanging batteries at the end of one shift, gives the truck operating power for the next shift.

The battery is charged from current produced wholesale by a central station—the lowest cost power obtainable. In combination with a high-torque electric motor, it gives the truck an instant flow of power for starting and acceleration, yet is instantly and completely off during the many momentary pauses between the forward, back, up, down, and tilting motions of the truck while engaged in picking up, carrying, tiering and setting down loads.

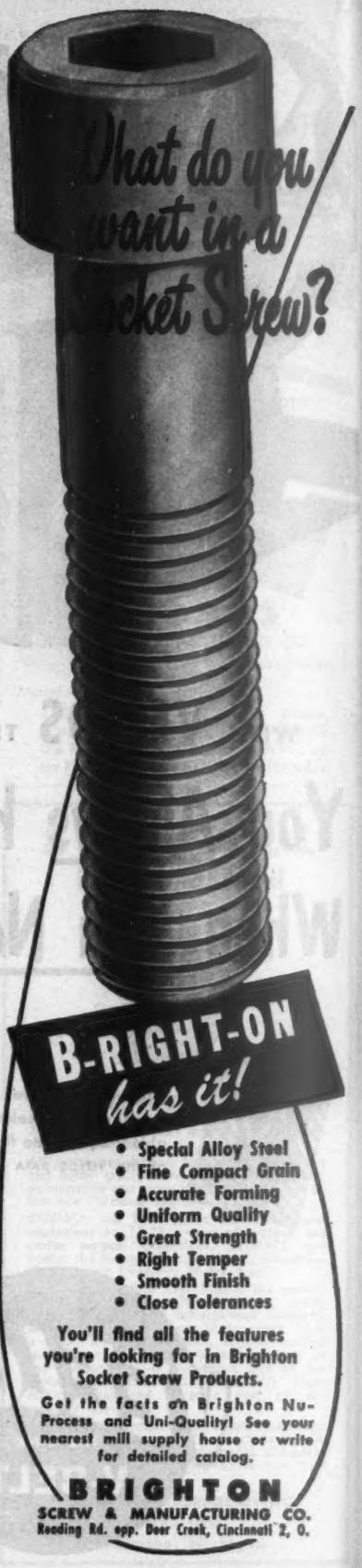
The electric-motor drive is just as dependable and trouble-free as in stationary-machine drives. The battery, its cells made of steel, its alkaline electrolyte a preservative of steel, its principle of operation foolproof, is the longest-lived, most trouble-free of all types of storage batteries. Send for our bulletin *Modern Material Handling* for more information on the advantages of the unit-load method of handling material, the power requirements of industrial trucks and the characteristics of EDISON batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

YOU CAN ALWAYS RELY ON

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES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B-RIGHT-ON has it!
• Special Alloy Steel
• Fine Compact Grain
• Accurate Forming
• Uniform Quality
• Great Strength
• Right Temper
• Smooth Finish
• Close Tolerances
You'll find all the features you're looking for in Brighton Socket Screw Products.
Get the facts on Brighton Nu-Process and Uni-Quality! See your nearest mill supply house or write for detailed catalog.
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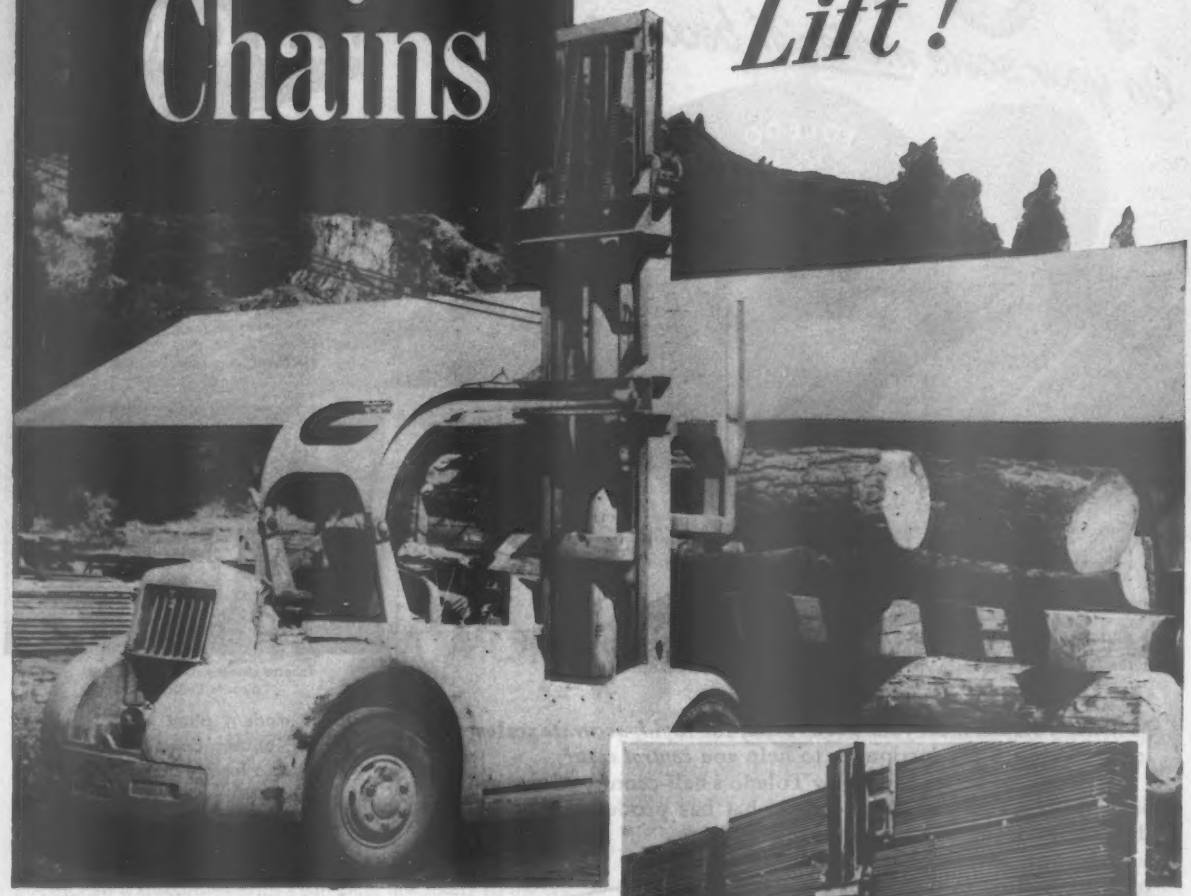
Whitney Chains

Help "Hyster" Make a Big Lift!



The 7½ ton "Hyster 150" gasoline-powered lift truck is a husky baby . . . handles loads quickly and efficiently. Its long 48" load arms pick up, stack, hold and place large and small loads easily — saves time and money in materials handling.

This kind of performance demands a chain drive that will stand up under severe operating conditions. That's why Hyster Company selected Whitney Chains for the elevating unit, to insure smooth positive operation and long service with minimum maintenance.

Maybe lift trucks aren't your problem. But if you have a power transmission design involving long or short centers, reversal of direction, timing motions, fractional or hundreds of horsepower, it will pay you to find out what precision built Whitney Chain Drives can do for you. We've been solving similar power transmission and conveying problems for over a half century.

Can we help on yours?

Consult your local Whitney Field Office or Distributor, or write direct to us for complete information and catalog.

WHITNEY CHAIN COMPANY

238 Hamilton Street, Hartford 7, Connecticut

Control Costs with TOLEDO

On your scale material becomes money!

50th ANNIVERSARY 1901-1951

PRINTWEIGH STOPS ERRORS . . . Provides printed weight records—at the instant of weighing—assuring that the accurate indication of the Toledo dial will reach your accounting records without chance of human error.

Modern Toledos meet your needs today for *rapid, accurate* scales in all phases of production . . . to help you *control costs!*

These are the scales backed by Toledo's half-century of experience in Research and Engineering that has produced 80% of the major advances in scales during this time.

Toledo engineering has not only specialized in the direct design of weighing machine mechanisms, but also in the many associated fields such as electronics, plastics, metallurgy, optics.

Check your needs *now*—select Toledo equipment for vital jobs in guarding materials and costs! Sales and service in 200 cities. Toledo Scale Company, Toledo 1, Ohio. We will be very glad to send catalogs.

NEW!
FLOOR SCALES
New recessed frame design fully guards against foreign material lodging beneath platform edge—choice of full or semi frame, with economical conversion for future needs. Double parallel link platform suspension means long life, accurate dependability. Send for bulletin 2406C.

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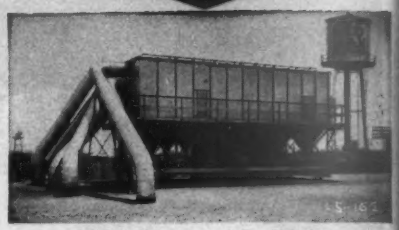
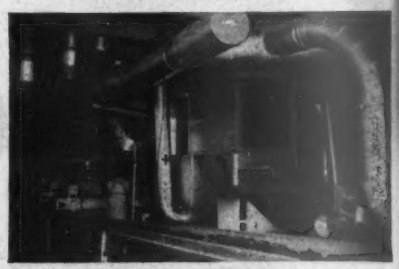
SLY

Pioneers and Leaders in INDUSTRIAL DUST CONTROL



SLY Dust Collector on roof at Pinkerton Tobacco Co. plant.



Tobacco cleaning machines with dust pipes to Collector.

● In its modern plant at Toledo, the Pinkerton Tobacco Company cleans and stems tobacco for sweetened scrap chewing tobacco. This would be a dusty operation—"air washing" the tobacco leaves—were it not for the SLY Dust Collector.

Suction pipes connected to each cleaning and separating machine carry off dust blown from the leaves along with small, unusable tobacco particles to the SLY Dust Collector on the roof. The result is (1) improved quality of product (2) reduced manpower requirements for plant clean-up (3) dust-free working conditions.

Sly Dust Control Systems are used to control more than 100 kinds of dusts in all kinds of manufacturing operations. Ask for Bulletin 98 and tell us *your* dust problem. Our experience with thousands of installations is at your disposal.

THE W. W. SLY MANUFACTURING CO.

4755 Train Avenue • Cleveland 2, Ohio

New York • Chicago • St. Louis • Philadelphia
Detroit • Minneapolis • Birmingham • Cincinnati
Los Angeles • Rochester • Toronto

A Georgia-Pacific "new dimension" in construction

THEY MOLD 'EM MONOLITHIC DOWN IN TEXAS

Here's a strip tease that'll make your eyes pop out . . . that is, if you go for figures.

Down Texas way recently they stripped the last forms off just about the finest monolithic structure in the U. S. It's the Thomas J. Lipton, Inc. building at Galveston, where clean lines and a smooth exterior bear mute testimony to the efficiency of GPX Plastic-faced Plywood.

Walls, floors and ceilings are all concrete . . . poured in forms of GPX . . . to create, from movable molds, a one-piece structure. Thanks to the satin-smooth, armor-hard surface of GPX, ceilings "set" so smoothly that no plastering was needed. Costly hand finishing was virtually eliminated.

In all, 200,000 square feet of surface area was poured in 32,000 square feet of GPX. And the same panels continued to make still further savings for the contractor on his next job.

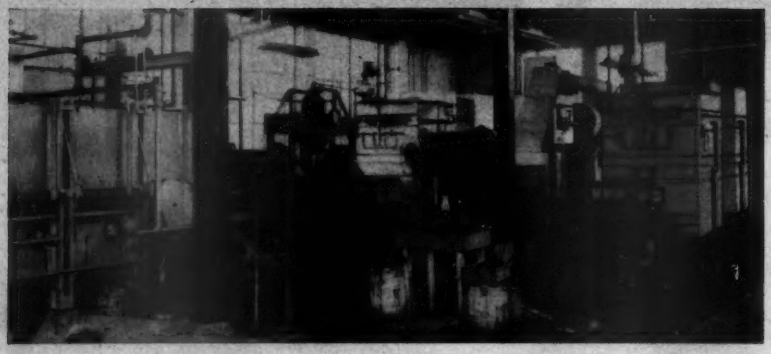
Other grades of Georgia-Pacific's Plastic-faced Plywood are helping to cut costs and do a better job in countless industrial applications. If you have a job where smoothness, lightweight strength and ruggedness pay off, send for this new folder on GPX — write Georgia-Pacific Plywood Company, 640 North Capitol Way, Olympia, Wash., or get in touch with your nearest Georgia-Pacific office.

GEORGIA—PACIFIC

PLYWOOD COMPANY

OFFICES OR WAREHOUSES IN: Augusta, Birmingham, Boston, Chicago, Columbia, Louisville, Memphis, Nashville, Newark, Olympia, Orlando, Philadelphia, Pittsburgh, Portland, Raleigh, Richmond, Savannah

DOUGLAS FIR PLYWOOD • HARDWOOD PLYWOOD • GPX • SOUTHERN & WESTERN LUMBER • DOORS



Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

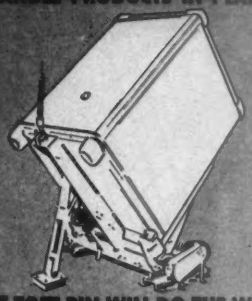
Over 35 Years' Service in Industrial Air Engineering

Dept. F, 405 Lexington Ave. **New York 17, N. Y.**

Experienced District Engineers in all Principal Cities

WHY BUY CONTAINERS

LET THE TOTE SYSTEM HANDLE
RAW MATERIALS TO YOUR PLANT
OR
FINISHED PRODUCTS TO CUSTOMERS
OR TO
HANDLE PRODUCTS IN-PLANT



ONE TOTE BIN WILL DO THE WORK OF 20,000 BAGS

THE TOTE SYSTEM
SAVES LABOR—PRODUCT LOSS
AND BAG COST!—IT'S SANITARY
LET US MAKE YOU A PROPOSAL
APPLYING THE TOTE SYSTEM

TOTE SYSTEM, INC.
FM-1 BEATRICE, NEBR.

KALMAN
PROCESS *makes*
CEMENT FLOORS
tougher!

No chance for a "softie" when you specify Kalman floors. In surfacing, Kalman "absorption control" densifies and pre-shrinks the topping, producing concrete of the highest compressive value — a uniformly tough surface of maximum durability.

Bulletin gives all the facts — yours for the asking!

KALMAN FLOOR COMPANY
110 E. 42nd St., New York 17, N. Y.
Boston • Charlotte • Chicago • Cleveland
Dayton • Detroit • Houston • Los Angeles
Philadelphia • San Francisco

SUNNEN EXTERNAL HONES Are Five Times Faster Than Lapping

—Says Detroit Manufacturer

Four External Hone Sets handle complete range from .120" to 2.750"

For Pins . . . Shafts . . . Arbors . . . Plungers . . . Spindles . . . Ejector Pins . . . Guide Pins . . . Plug Gages . . . Metering Rods . . . Valve Needles . . . Spools . . . and other external diameters from .120" to 2.750".

These hones are guaranteed accurate to within .0001"—25 millionths can be held in some applications, with stock removal controlled all the way. Surface finish of 2 micro-inches RMS can be obtained in hardened steel. Sunnen External Hones are ideal for removing centerless grind patterns, for correcting barrel, taper, out-of-round, waviness, and heat treat warpage.

If close tolerances on O.D.'s are a problem in your plant, you should know what Sunnen External Hones can do for you. Send for Free descriptive booklet.

637

TYPICAL APPLICATIONS

Valve spool Needle valve Gage bar Ram

SUNNEN PRODUCTS COMPANY

7958 Manchester Avenue • St. Louis 17, Missouri

Canadian Factory: Chatham, Ontario

To: SUNNEN PRODUCTS CO.
7958 Manchester Ave., St. Louis 17, Mo.

☐ Please send bulletin on external honing. ☐ Have representative call.

Name.....

Company.....

Address.....

City.....Zone.....State.....

How costly is YOUR D* FACTOR?

D* means DUST!

—and DUST in a modern industrial plant means operating losses. Uncontrolled DUST accelerates high-precision machine wear, contaminates products, multiplies maintenance and cleaning costs, and creates unhealthy, unattractive working conditions.

DUST can be explosive, hazardous to health, valuable, or it can be worthless and a nuisance. Regardless of its characteristics, uncontrolled DUST always results in higher operating costs and reduced profits.

If your operations indicate a need for dust control, our 35 years' experience exclusively in this field can prove valuable to you. DRACCO engineers can eliminate your D factor by furnishing a high efficiency DRACCO Dust Control system accurately designed to meet your specific needs.

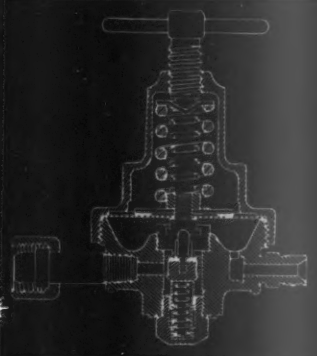
It will pay you to analyze your D factor and to write for complete data on a DRACCO installation as applied to your problem.

DRACCO CORPORATION
4078 E. 116th St., Cleveland 5, Ohio or
415 Lexington Avenue, New York 17, N. Y.

AGENTS IN PRINCIPAL CITIES

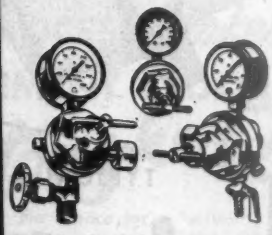
DRACCO *Performance Proved*
DUST CONTROL EQUIPMENT
PNEUMATIC CONVEYORS • METAL FABRICATION

DEPEND ON DURABLE DOCKSON REGULATORS



in types for Oxygen, Acetylene, CO_2, Air, Fuel Gases.

"BUILT FOR BETTER SERVICE" with improved diaphragms, replaceable, self-aligning seats; sturdier construction; shatter-safe gauges; alert safety valves and other advantages.



THERE IS A DOCKSON DISTRIBUTOR NEAR YOU—Let us send you his name and our complete catalog of DOCKSON WELDING and CUTTING EQUIPMENT.

Dockson CORPORATION
3439 WABASH • DETROIT 8, MICH.

COLUMBIA STEEL TANK CO. REPORTS THESE 3 ADVANTAGES

This Kansas City, Missouri, tank fabrication plant handles bulk storage tanks, structural members, truck tanks, flat sheet steel, angles, bars. Materials are handled in many sections of their plant yard. The same advantages they point out can pay dividends on your material handling jobs. Get the cost-cutting, labor-saving Lorain Crane story from your Thew-Lorain Distributor!

"Highly Adaptable to Loading . . ."

Columbia Steel Tank Co.'s Lorain handles just about every size, shape and type of steel that enters or leaves their plant. From flat sheets to bulky tanks, it does the job. Depending on your needs, you can equip your Lorain Crane with any of 16 or more lifting attachments — all interchangeable — for any lifting, loading, unloading or material handling duty.

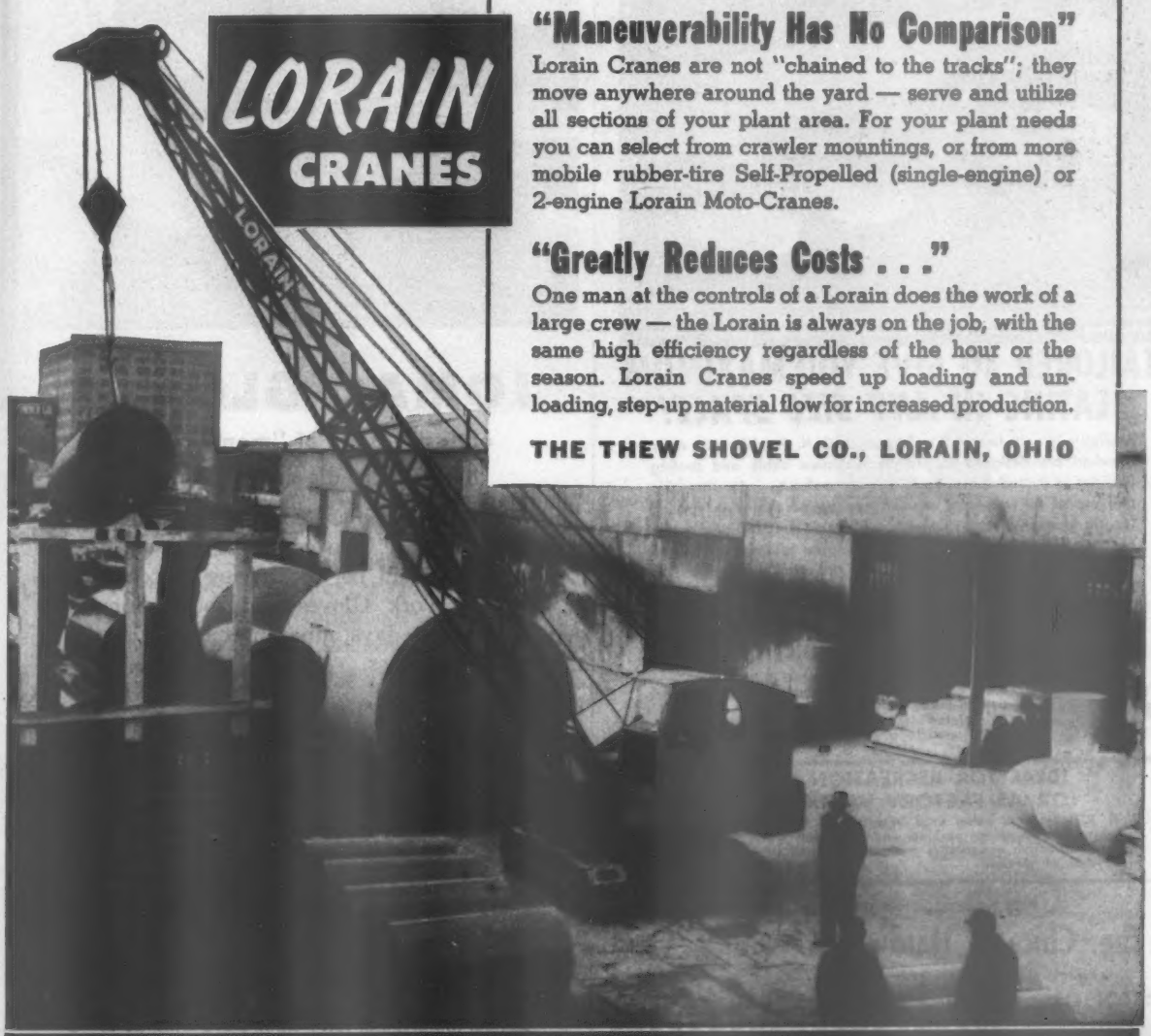
"Maneuverability Has No Comparison"

Lorain Cranes are not "chained to the tracks"; they move anywhere around the yard — serve and utilize all sections of your plant area. For your plant needs you can select from crawler mountings, or from more mobile rubber-tire Self-Propelled (single-engine) or 2-engine Lorain Moto-Cranes.

"Greatly Reduces Costs . . ."

One man at the controls of a Lorain does the work of a large crew — the Lorain is always on the job, with the same high efficiency regardless of the hour or the season. Lorain Cranes speed up loading and unloading, step-up material flow for increased production.

THE THEW SHOVEL CO., LORAIN, OHIO



THEW LORAIN LORAIN CRANES FOR INDUSTRY

CHICAGO HARDWARE FOUNDRY

Sectional Tables

WITH SWING SEATS

Installation of Chicago Hardware Foundry S-314 Sectional Tables in the employees cafeteria of the Squire-Dingee Company, Chicago, Illinois

TAILORED TO GIVE YOU MAXIMUM SEATING IN *ANY SIZE SPACE!*

Available in units to seat 2 to 24 people, C. H. F. tables with seats attached are designed to provide maximum table and seating facilities in limited space. Seats swing completely under the table and out of the way and sections may be purchased in varying lengths to meet your special requirements. C. H. F. sectional tables are standard equipment for schools, factories, clubs, churches and all types of institutions. Send for free literature and get all the facts TODAY

AVAILABLE IN A VARIETY OF COLORS AND CHOICE OF SEATS

Table frames may be finished in standard gray, black or white paint . . . or special colors. In addition to hardwood natural finish seats, comfortably upholstered seats with back are also available upholstered in genuine leather or Duran All-Plastic in colors.

IDEAL FOR RECREATION ROOMS OR AS FACTORY WORK TABLES

C. H. F. tables are being used in cafeteria, recreation rooms, clubs and also for wrapping, packing and inspection work. They combine modern, attractive appearance with durable cast iron construction to give years of service.

DISTRIBUTORS IN PRINCIPAL CITIES

The Chicago Hardware Foundry Co.

"Dependable Since 1897"

11101 Commonwealth Ave., North Chicago, Ill.

THE CHICAGO HARDWARE FOUNDRY CO.
11101 Commonwealth Avenue
North Chicago, Ill.

Gentlemen: Please send new literature on Sectional Tables

☐ Also send 8 page brochure on Sani-Dri Electric Hand and Face Dryers for Washrooms.

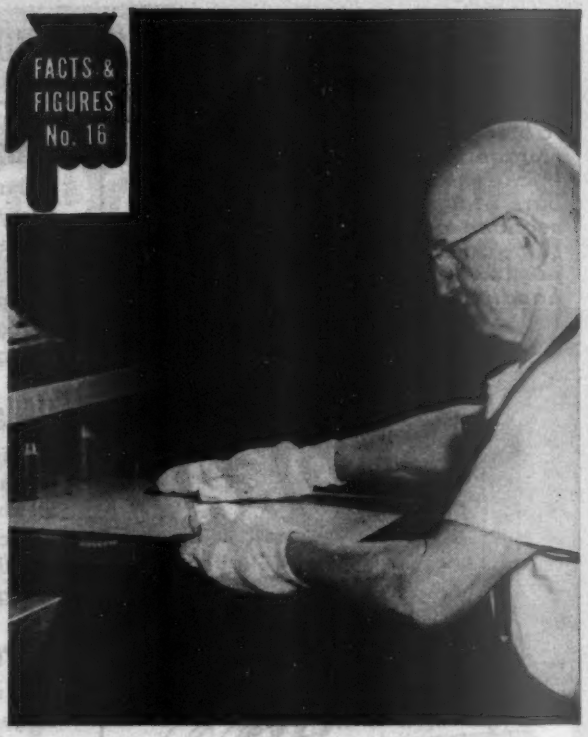
NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

FACTS & FIGURES No. 16



JOMAC GLOVES

outlast 9 pairs of "monkey face" gloves in die-casting plant

A die-casting plant* had been using up "monkey face" gloves at the rate of three pairs per man per day. They switched to Jomac Work Gloves and found Jomacs lasted three days, nine times as long as the old-style gloves.

*Name on request.

★ ★ ★

In machine shops, bakeries, heat-treating departments, foundries, and dozens of other jobs, Jomac Gloves protect men's hands against heat or cold, rough or sharp edges. Jomacs outlast ordinary work gloves 7 to 1. They're reversible and can be worn on either hand. Both sides are worn out before you throw them away. Jomacs are washable, and can be used over and over. Jomacs stay soft and flexible even after repeated washing or dry-cleaning. Dollar for dollar, your best buy is Jomac, the original terry cloth glove with the extra wear built in.

C. WALKER JONES CO.

6135 N. LAMBERT STREET

PHILADELPHIA 38, PA.

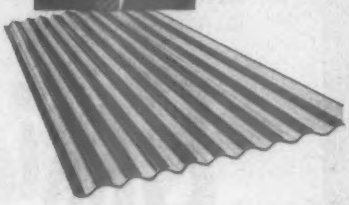
120,000 SQUARE FEET OF THE TOP VALUE IN ROOFING AND SIDING

Applicator:
M. W. Nabakowski,
vice-president of the
A. Nabakowski Co.

The Thatcher Glass Company plant at Lawrenceburg, Indiana, called for 120,000 sq. ft. of roofing and siding. The owners and their architects, Herman and Associates, Cincinnati, liked the idea of aluminum. They knew its lighter weight (56 lbs. per square) would save on framing. They knew this rustproof, corrosion-resistant metal would need no painting—practically eliminate maintenance. And aluminum's heat reflectivity would make the buildings cooler in summer, warmer in winter.

M. W. Nabakowski, Amherst, Ohio, roofing and siding applicator, has this to say: "Reynolds Industrial Corrugated is an ideal material because the finished job has eye-appeal, workmen like to handle it, and application costs are easily controlled." But the best testimonial will be written through the years, in superior performance and maintenance economy. It's the top value you want in your next construction. Call on Reynolds for literature, technical assistance and application details.

Offices in principal cities. Check your classified phone book for our listing under "Building Materials," or write: Reynolds Metals Company, Building Products Division, 2005 South Ninth Street, Louisville 1, Ky.



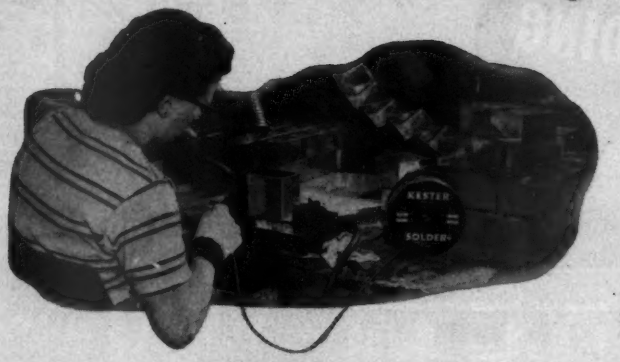
Specifications for Reynolds *Lifetime* Aluminum Industrial Corrugated:

- Thickness .032"
- Corrugations 7/8" deep, 2-2/3" crown to crown
- Uniform load support (roof) 80 p.s.f. on 4' purlin spacing
- Uniform wind load capacity (siding) 20 p.s.f. on girt spacings up to 7'9"
- Roofing width 35", coverage 32"
- Siding width 33-3/4", coverage 32"
- Lengths 5', 6', 7', 8', 9', 10', 11', 12'

Aluminum is required for planes and other military needs. Reynolds *Lifetime* Aluminum Industrial Corrugated is still produced, but the total supply is necessarily reduced. Rated orders receive priority handling.

REYNOLDS *Lifetime* ALUMINUM INDUSTRIAL CORRUGATED

Kester Solder



Flame Soldering with Kester "Nosput" flux-core solder. One of Kester's specialized industrial solders that does this job better than any other solder.

No Waste

"Nosput" flux-core solder is only one member of Kester's famous group of flux-core solders. In all there are over 100,000 different types and sizes.

Efficient

Kester can supply the right solder for the job, virtually eliminating waste and rejects. Call in a Kester expert and have him analyze your customers soldering operations.

Kester Solder Company
4201 Wrightwood Ave. • Chicago 39, Illinois
Newark, New Jersey • Brantford, Canada

Send for free manual: "SOLDER and Soldering Technique"

KESTER SOLDER

Standard for Industry since 1899

TEAMWORK and TIMING renews FLOOR

Actual photograph showing clean new floor areas in Brown's Bakery, Toronto, Canada.

The Toronto Bakery of Brown's Bread, Ltd. had a *hot* schedule. The bakery was in operation 24 hours a day for almost 7 days a week, but still something had to be done to preserve the floor and reduce cleaning costs.

Don Cudahy, the Tremco Man, looked the situation over and discovered the plant recessed from Saturday noon to early Sunday morning. Arrangements were made with the City Floor Sanders of Toronto to move in at 12:00 to sand and treat the floor in sections during the short lull in the plant operation.

After sanding, the floor was treated with Tremco Penetrem which dried before it was necessary to walk on the floors. 7,000 square feet of floor were renewed by this method—a method employed not only in bakeries but in all kinds of industrial plants, schools and institutions throughout the country.

Production Manager Lorne Bridger is pleased with the manner in which the Tremco Man solved this problem of timing, and reports that *sanitary conditions have been improved—cleaning costs cut in half*—an important maintenance cost factor in a bakery as large as this.

Don Cudahy Tremco Man

Your Tremco Man has the experience and know-how to solve any problem of floor maintenance or reconditioning. It costs less to ask the man who knows. Write The Tremco Manufacturing Co., Cleveland, Ohio.

TREMCO

PRODUCTS AND METHODS FOR BUILDING MAINTENANCE

(UM-3000)

To get over-all protection...

Make sure you start at the roof!

Check flashings around chimneys . . . along coping firewalls . . . down spouts . . . vent pipes . . . troughs . . . and eaves. See that all of these danger spots are sealed with a good roofing compound. Stain or paint wooden shingle roofs regularly.

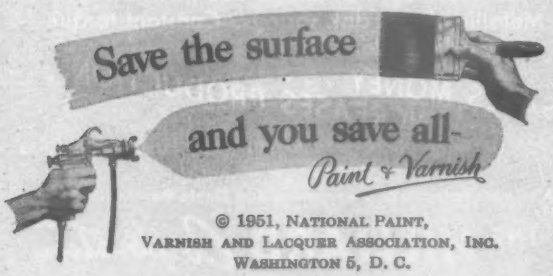
Coat all gutters and spouting to prevent rust! Beware of "alligatoring." A good roofing compound will check this. If your roof is asphalt, keep the asphalt coating renewed or the felt will rot and have to be replaced at great expense.

Your roof protects not only your building but everything in it! A leaky roof can cause expensive damage to walls, furniture, fixtures, and floors. During these days of threatened shortages this can be critical!

So, have your roof checked regularly. Keep it in good repair with quality paint products. This is one sure way to prevent large bills for extensive, time-consuming repairs.

Remember, it always costs more NOT to Paint!

Repair all loose seams, cracks or breaks. *Patch all breaks immediately.* Metal roofs rust . . . composition roofs dry out . . . concrete roofs disintegrate and gravel roofs parch and check. *Paint has the protective quality at low cost—added economy by reducing maintenance expense.*



© 1951, National Paint, Varnish and Lacquer Association, Inc.
Washington 5, D. C.

The NEW *Improved* series of HILLIARD *Slip Clutches*

★ PROTECT YOUR MACHINERY FROM DESTRUCTIVE OVER-LOAD

★ IMPROVE THE CONTROL OF YOUR REWIND STAND

REGULAR SERIES—From 50 inch lbs. to 300,000 inch lbs. torque. Prevents transmission of overload. Constant torque clutches can be pre-set.

NOW AVAILABLE — Adjustable while running constant tension clutches. Provide ample friction surface for heavy duty use in reeling and winding operations.

THE NEW LIGHT SERIES—high capacity in small size. From 10 inch lbs. to 500 inch lbs. torque. Metallic plates, disk springs. Constant torque—easily adjustable.

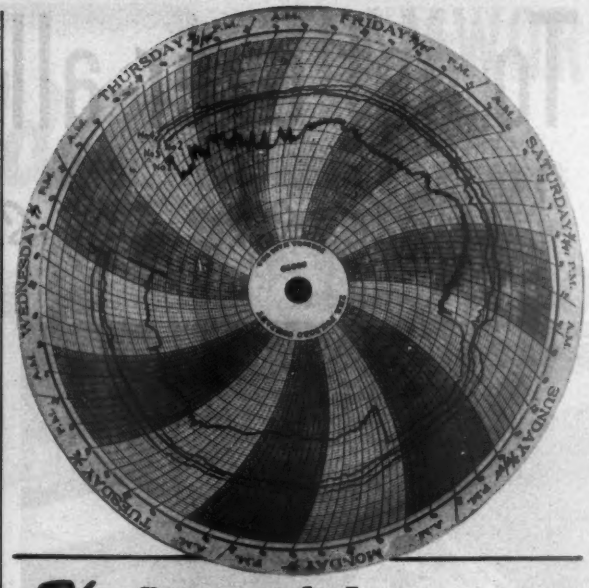
SAVES MONEY . . . INCREASES PRODUCTION . . .

FOR DETAILED INFORMATION WRITE FOR BULLETIN NO. 300

Also manufacturers of over-running and Single Revolution Clutches

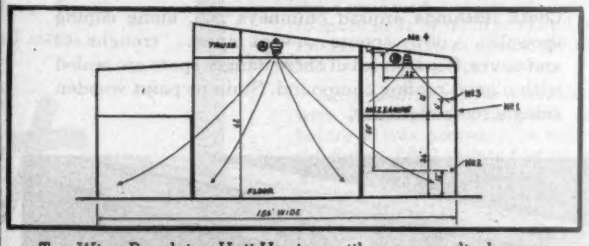
THE **HILLIARD** *Corporation*

101 West Fourth Street · **Elmira, New York**



The Story of the TEMPERATURE CHART

Replacing an expensive but inadequate heating system, Wing Revolving Unit Heaters completely solved a difficult heating problem in a shipbuilding plant. The building is 156' wide by 62' to the cross beams by 802' long. A mezzanine is 42' by 21' to the cross beams by 802' long.



Ten Wing Revolving Unit Heaters with one-way discharges cover the section marked "A" on the diagram. Ten smaller Wing Revolving Heaters cover the mezzanine section marked "B". Fairly high working temperatures (75° F) were required. The chart from a recording thermometer with bulbs located as shown, reveals graphically the working temperatures, the relatively low ceiling temperatures and the fluctuating outdoor temperatures (32° to 75° F) over one week's time.

Write for further details and a copy of Bulletin HR-6.

L. J. Wing Mfg. Co., 162 Vreeland Mills Rd., Linden, N. J.
Factories: Linden, N. J., Montreal, Can.
In Europe . Etab. WANSON, Brussels, Belgium

Wing REVOLVING UNIT HEATERS

THE NEW WAY

. . **BEHR-MANNING BELT FINISHING METHODS** help P. E. Guerin, Inc., of New York achieve that satiny "old world" finish on their brass products, so admired by lovers of fine craftsmanship.

LIGHTNING® METALITE® Cloth Belts, with every sharp abrasive grain electro-coated in its sharp-end-up, best cutting position, and anchored firmly to the flexible cloth backing by the firm, double-grip of the DURABONDED® process, produce this finish free of scratches, marks and holidays — and with assembly-line production speed and economy.

Behr-Manning belts and engineering are putting contour and pre-plating finishing on a higher production plane everywhere. See what they can do on your work. Write for a demonstration. Address Dept. F-10.

BEHR-MANNING®

NORTON abrasives®

BEHR-MANNING · TROY, N. Y.

COATED ABRASIVES • SHARPENING STONES

PRESSURE-SENSITIVE TAPES

EXPORT: BEHR-MANNING OVERSEAS INC., NEW ROCHELLE, N. Y., U. S. A.

See the difference

A. O. SMITH SAFETY GRATING

Full 100% serration of all bearing bars and cross bars insures 360° non-slip protection . . . in any weather . . . under all conditions.

More Apex Safety Grating, made by A. O. Smith Corporation, is used on America's railroads than all other makes combined. For 15 years A. O. Smith *locked-for-life* grating construction has provided the ultimate in strength and reliability in this, the severest service of all.

Now this time proved safety grating is available for industrial applications. You owe it to the safety of your employees to specify this outstanding safety grating.

Let A. O. Smith put your plant on a safe footing.

Stair Treads . . . and plain surface grating . . . where maximum non-skid protection is not essential . . . are also available.

A.O.Smith

Safety Grating and Stair Treads

District Offices: Chicago 4 • Dallas 2 Houston 2 • Los Angeles 22 • New York 17 Pittsburgh 19 • Tulsa 3

A FEW TERRITORIES STILL OPEN TO DISTRIBUTORS

A. O. Smith Corporation
Grating Division, Dept. F-1051
Milwaukee 1, Wisconsin

Without obligation send me complete information on your Safety Grating.

Name_____

Firm_____

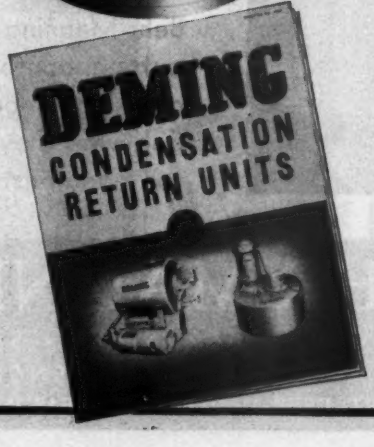
Address_____

City_____ Zone___ State_____

☐ I am interested in a Distributorship.

Deming "MOTOR-MOUNT" Condensation Return Units (Above and at right). Single and Duplex units for 2,000 to 40,000 sq. ft. of radiation.

Deming Fig. 4958 Centrifugal Jet Units (below) for 500 to 10,000 sq. ft. of radiation.



by **DEMING**

• These modern, efficient "fuel-savers" return the condensate from steam coils, radiators, or steam operated equipment back to boilers.

Motors on the "MOTOR-MOUNT" units have standard NEMA type "C" mounting flange and are furnished for single phase, two or three phase or for direct current, as specified.

Fig. 4958 Centrifugal Jet Units are unusually compact, requiring very little floor space.

Illustrated BULLETIN NO. 4400 includes performance tables which simplify selection of the right units to meet your specific requirements. Write for a copy.

THE DEMING COMPANY
530 Broadway • Salem, Ohio

INDIVIDUAL
CUTTING OIL
SANITATION
FOR YOUR PLANT!

Here's how to prevent costly coolant spoilage and eliminate foul odors: ask your DOLGE Service Man to take samples of your coolant for *free* bacteriological and chemical analysis. A complete laboratory report will show the correct coolant handling method for *your particular operation.*

Only if tests warrant it will a DOLGE STERIDOL GERMICIDE be recommended — a "tailor-made" preparation to meet *your exact needs.* Used as directed it will not irritate the skin or corrode metals. The cost?— Far less than a cent per gallon of coolant!

Write for Booklet "Cutting Oil Sanitation"

STERIDOL

dependable DOLGE

WESTPORT, CONNECTICUT

AMERICAN
REG. U. S. PAT. OFF.
LUMBER CRAYONS
give you
MORE "MILEAGE"
per MARKER

Made of high grade pressed earth—the crayon material of long life.

Strongly wrapped to prevent breakage and waste.

Makes a clear, bright mark that requires no "going over".

400 Series—for wet or dry, green or seasoned lumber.

425 Series—extra long —even LONGER LASTING!

465 Series — mammoth size for grading logs.

FREE! Industrial Crayon Guide Write today. Dept. F-45

the AMERICAN CRAYON company Sandusky, Ohio

Maintenance time on these Asphalt Tile Floors has been

CUT BY TWO-THIRDS!

also—MULTI-CLEAN ASPHALT TILE PRESERVER REDUCED MATERIAL COSTS 50%

That's what has happened the past two years on the office, plant hospital and cafeteria floors at the Seeger Refrigerator Company, St. Paul, Minnesota, World's Largest Exclusive Refrigerator Manufacturer.

Multi-Clean Asphalt Tile Preserver is applied to these busy floors only four times a year. Both new and old asphalt tile receive the treatment which restores and protects the natural beauty, color and lustre of the tile, *without waxing.* (Formerly, waxing was required 3 to 4 times a month.)

An occasional buffing with a Multi-Clean Floor Machine and No. 0 Multi-Clean Steel Wool Disc puts a long lasting, beautiful, anti-slip sheen on the floors. Daily dry sweeping and weekly damp mopping, both of which are more quickly accomplished because of the Multi-Clean treatment, complete this simplified, low cost maintenance by the Multi-Clean Method.

THE MULTI-CLEAN METHOD

The floor treatment used at Seeger's is only one application of the Multi-Clean Method. This is a proven three-way program for all types of floors. It includes (1) right materials for your floors (2) floor machines to reduce the labor and (3) detailed instructions for their proper use under various conditions in various industries.

Every Multi-Clean product carries a 100% guarantee!

FREE! FLOOR MANUALS

Each for the proper care of a specific floor. Check the coupon for the floors in your plant.

MULTI-CLEAN®
PRODUCTS, INC.

MULTI-CLEAN PRODUCTS, INC.
2277 Ford Parkway, Dept. FM-10, St. Paul 1, Minn.

Please send me details on Asphalt Tile Preserver and the manuals I have checked.

☐ ASPHALT TILE ☐ CONCRETE ☐ RUBBER TILE
☐ WOOD ☐ TERRAZZO ☐ LINOLEUM
☐ NINE-JOB FLOOR MACHINE ☐ WET-DRY VACUUM ☐ ALL-PURPOSE SCRUBBER

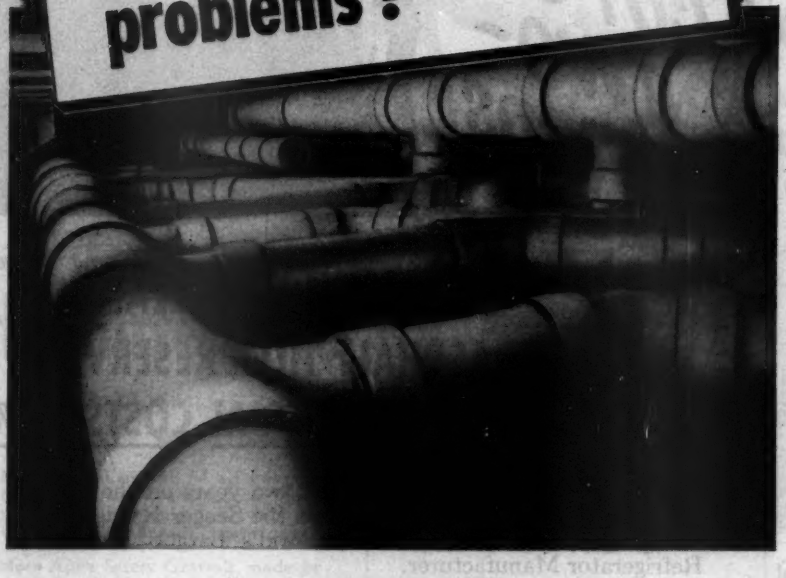
*Name and Title*_____

*Company*_____

*Address*_____

*City*_____ *Zone* ___ *State*_____

Why does THIS pipe solve tough venting problems?



...it's made of corrosion-resistant TRANSITE*

IT'S NO SECRET why Transite* Industrial Vent Pipe has solved difficult venting problems for many plant engineers ... and thereby lowered their maintenance costs.

This tough, durable asbestos-cement pipe successfully resists many of the corrosive fumes, vapors, and gases encountered in a wide variety of industrial operations ... helps avoid frequent replacements that waste both time and money.

In addition, Transite Industrial Vent Pipe is non-metallic and therefore rustproof—needs no painting or other protective treatment. It can be used as ducts, vents or stacks in either indoor or outdoor service.

Plant men appreciate its light weight, plus the fact that it can be cut and drilled with ordinary tools. And it comes in a complete range of sizes up to 36" in diameter ... with a complete line of rustproof, corrosion-resistant fittings that adapt it to practically any job requirement.

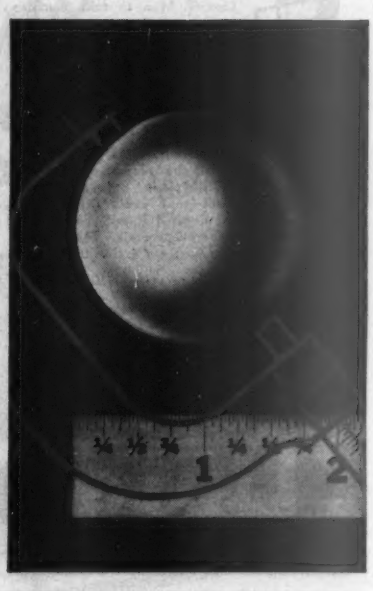
You will find further details on Transite Industrial Vent Pipe in Data Sheet Series DS-336. For your copy write Johns-Manville, Box 290, New York 16, N. Y. In Canada, 199 Bay Street, Toronto, Ontario.

*Transite is a registered Johns-Manville trade mark

Johns-Manville
TRANSITE Industrial Vent PIPE

ONLY A BALL

has { one dimension / one surface



but oh—how important

Important not only in precision ball bearings, but also in the lot of other applications where Strom metal balls have been doing the job better. Strom has been in on a great many ball-application problems, and knows how important these two factors are for the best results.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity, and dependable physical quality, there's not a better ball made.

Strom
STEEL BALL CO.
1850 South 54th Avenue
Cicero 50, Illinois
Largest Independent and Exclusive Metal Ball Manufacturer

LUFKIN

"LEADER"

chrome-clad steel tapes

give you...

EASY TO READ MARKINGS THAT ARE DURABLE

CHOICE OF STANDARD OR FOLDING HOOK RING

Famous *Lufkin* Chrome-Clad finish on tape line gives non-glare readability . . . will not chip, crack, peel or corrode. Black markings are permanent . . . they're bonded to the steel and sunk deeply below the hard chrome-white surface, preventing wear. Vinylite covered case protects against water, stains, and scuffs.

Try out the *Lufkin* "Leader" at your dealer's . . . check its smooth operation, accuracy, and exclusive features. Choose the *Lufkin* "Leader" and you select the finest.

BUY THROUGH YOUR DISTRIBUTOR

BUY LUFKIN

Tapes — Rules — Precision Tools

THE LUFKIN RULE CO. 142

SAGINAW, MICHIGAN, — Barrie, Ontario

132-138 Lafayette St., New York City

Ruggedly Safe

—to do any jacking job better!

SIMPLEX JACKS

Re-Mo-Trol HYDRAULIC PULLERS

(PUMPS AND REMOTE CONTROLLED RAMS)

10 to 100 ton capacities

UNIQUE "CENTER-HOLE"* minimizes rigging and set-up—provides more effective power.

Simplifies tough pulling jobs! Pull rod or screw is drawn *through* ram plunger in straight, torque-free pull. Ram is own backup. Also lifts or presses.

*"Center-Hole" in rams of 30 ton and greater capacities.

RATCHET LOWERING JACKS

Lift or lower the load notch by notch. Cannot be tripped. *Toe* has *same capacity* as cap! High lift with minimum clearance means less set-up, less blocking. Single or double acting. 1½ to 20 ton capacities.

HYDRAULIC JACKS

Fast, easy power! Operate vertically or horizontally with same efficiency. Tested to 50% over rated capacity. Single or double pump models; 3 to 100 ton capacities.

SCREW JACKS

Cap floating on single chrome-moly ball reduces friction 88%. Forged cap corrugated for safety. Malleable iron base flared for stability. Four-way or ratchet heads. 10 to 24 ton capacities.

Other SIMPLEX JACKS include:

Simplex-Jenny Hydraulic Pullers

Push and Pull Jacks and Accessories

Reel or Drum Jacks

Trench Braces

Timber Braces

WRITE FOR GENERAL CATALOG No. 50

Simplex

LEVER · SCREW · HYDRAULIC

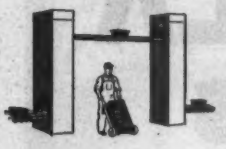
Jacks

TEMPLETON, KENLY & CO. 1018 South Central Avenue, Chicago 44, Illinois

Reciprocating Lift

New! Flexible!
Saves Space!

Now speed material flow from floor to floor in minimum space. Load and unload on same side or on opposite sides. Two units allow passage through your conveyor line or permit clearance of obstacles. Automatic or manual control. Limit switches and automatic spacing devices assure trouble-free operation. May we show you how our standardized reciprocating lifts can be applied to your particular requirements. Write today!



CONVEYOR SPECIALTY COMPANY, INC.

32 Newport Avenue, North Quincy 71, Mass.

Belt Conveyors • Slat Conveyors • Gravity Conveyors • Press Conveyors • "Unitable" Belt Conveyor • Unipac Handler (Portable Piler) • Complete Package Handling Systems

IF you change your address,

please be sure to let us know promptly. It takes time to correct the stencil addressing plate. And we don't want you to miss copies of FACTORY.

Also . . . . . .

be sure to give us *both*

(1) your OLD address
and
(2) your NEW address.

We need them *both* to make the the change.

FACTORY
Management and Maintenance
330 W. 42d St., New York 18, N. Y.

free your draftsmen from tedious lettering jobs . . .

Vari-Type Lettering

BILLS OF MATERIAL, SPECIFICATIONS, NOTES ETC. . . ALL EXPERTLY LETTERED BY YOUR TYPIST. . . . . ON A VARI-TYPER LETTERING MACHINE.

THE VARI-TYPER LETTERING MACHINE OFFERS THE FASTEST METHOD OF LETTERING BILLS OF MATERIAL, NOTES, SPECIFICATIONS ON TRACINGS AND DRAWINGS, AND COUNTLESS OTHER LETTERING DETAILS NOW BOTTLE-NECKING THE DRAFTING ROOM OUTPUT. THE VARI-TYPER LETTERING MACHINE IS FOUR TO FIVE TIMES FASTER THAN HAND LETTERING AND IS OPERATED BY AN OFFICE TYPIST.

SAVE YOUR DRAFTSMEN'S TIME FOR MORE IMPORTANT CREATIVE DRAFTING WORK.

TYPE FACES ARE INSTANTLY AND EASILY INTERCHANGEABLE OFFERING HUNDREDS OF DIFFERENT SIZES AND STYLES FROM WHICH TO CHOOSE.

Letters any size tracing . . . even 6 feet or more.

RALPH C. COXHEAD CORP.
720 Frelinghuysen Avenue, Newark 5, N. J.

Please send me Vari-typer Booklet No. A29

Name .....
Company .....
Address .....
City ..... **Zone** . . . **State** .....

A real time-saver—tool is always at hand.

Combined

PNEUMATIC TOOL SUSPENSION AND AIR SUPPLY

HOSE which supplies air suspends pneumatic tool directly over the work spot . . . always handy. Weight of tool is counterbalanced by spring tension of the reel. Releasing tool lifts it automatically to predetermined, convenient position. This simple device speeds up production, lessens fatigue, reduces tool maintenance cost, saves hose and eliminates accidents. No cable suspension necessary. There are no unsightly and dangerous loops of hose. Tension is easily changed. A completely packaged unit. Easy to install in any position. See your jobber or write today for more information.

Wayne

Hose Reel Division

THE WAYNE PUMP COMPANY • FORT WAYNE 4, IND. • TORONTO

INDUSTRIAL HOSE REELS

FOR AIR, WATER, FLUID LUBRICANTS AND COOLANTS

INDUSTRIAL CONSULTANTS

R. M. BATHHURST
Registered Professional Engineer
Industrial Studies—Management Reports
PROJECT DEVELOPMENT
801 West 15th St., Tyrone, Pennsylvania
Phone 1574-M

THE EMERSON ENGINEERS
Management Counselors Since 1899
Plans — Controls — Incentives
for
Profit Making Management
30 Rockefeller Plaza New York 20, N. Y.

GEMAR ASSOCIATES
Materials Handling Consultants
Warehousing — Plant Layout
Production Handling
Greenwich Connecticut

INDUSTRIAL TRAINING CONSULTANTS, INC.
Satisfactory Solutions of
Training Problems Assured
COMPREHENSIVE — SUPPLEMENTAL
SURVEYS — ANALYSES — GUIDANCE
Lock Box 425, Trenton, New Jersey

If you have a plant management problem, contact the appropriate consultants whose cards appear on this page. The offering of their special services nationally, justifies your confidence in their ability to give you competent counseling that can effect appreciable SAVINGS for you.

LESTER ASSOCIATES, INC.
Designers and Manufacturers of
TRAINING DEVICES—VISUAL AIDS—
INDUSTRIAL PLANNING MODELS—
RELIEF MAPS AND
ANIMATED FLOW CHARTS.
24 Aqueduct Lane, Hastings-on-Hudson, N. Y.
HAstings 5-4454—4838

METHODS ENGINEERING COUNCIL
H. B. MAYNARD, President
Consultants in Industrial Management
718 Wallace Ave.—Pittsburgh 21, Pa.

ALLAN H. MOGENSEN
Director
Work Simplification Conferences
330 W. 42nd Street New York City
Box 30 Lake Placid, N. Y.

R. M. MUCH and ASSOCIATES, Inc.
Consultants
Materials Handling from end to end.
161 Devonshire Street, Boston, Mass.
We do not sell equipment
MUCH
"There is nothing like ∧ experience"

W. W. SLOCUM & CO.
Engineers
Industrial—Design—Management
744 Broad St., Newark 2, N. J.

H. H. WHITCOMB
Director
Balanced Management
for
Greater Productivity & Profits
141 Milk St., Boston 9, Mass.

WHERE TO BUY

Featuring many cost-cutting products to help solve production problems

LIGHT METAL FABRICATING

Here are fabricating and assembly facilities to tie in with your production . . . large or small runs. We welcome work as subcontractors. Send parts, blueprints, or write to:

Warren Steel Specialties Corp.
1313 Niles Ave., Warren, Ohio

FLUX
for
SODERING
SILVER SODERING
WELDING
BRAZING

L. B. ALLEN CO., INC.
6781 BRYN MAWR AVE., CHICAGO 31, ILL.

STOP DUST

DUSTKOPS UNIT TYPE LOW COST — **22 Models** 300 cfm to 10,000 cfm ¼ hp to 15 hp.

AVAILABLE FROM STOCK
For: Grinders, buffers, polishers, woodworking, lint . . . ALL DUSTS
Send for Cat. 605f; describe problem for recommendation by return mail, without obligation
AGET-DETROIT CO. • ANN ARBOR, MICH.

STANDS 50,000 LB. LOADS
60 seconds after application
SWIFT-FLOOR
FLOOR RESURFACER
No production delays. Just prime, fill, trowel—over wood, concrete, steel or new floor or patch. Write for free book!
MONROE MAINTENANCE MATERIALS
THE MONROE COMPANY, INC.
CLEVELAND 6, OHIO

MISCELLANEOUS EQUIPMENT

Begins on page 206

Portable Plating Barrel

Here's a portable plater for processing small batches of parts. You can use it with acid or alkaline solutions at temperatures below 185 degrees F.

Tumbling cylinder, stand, and gears are all made of Plexiglas. There are two sizes—a 6-in. diameter cylinder 12 inches long, and an 8-in. cylinder 18 inches long.

Maker says unit is light weight, easily handled. Rheostat control varies barrel speed. The 1/15-hp. motor runs on 110/220-volt, single phase, 60 cycle line.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Molecular Shock Absorber

The Movaco shock absorber doesn't look like one. But when used in machine mounts, the maker claims it transmits hardly any vibration to the floor. All the shock energy, they say, is dissipated to the air as radiant heat.

The absorber consists of 25 layers (each about 5 molecules thick) of oil and air sandwiched between thin copper sheets. This combination is compressed under heavy pressure, then hermetically sealed in a steel jacket.

Movaco engineers claim that a shock wave hitting this absorber doesn't have much chance to get through. A portion of the shock is reflected at each metal-air boundary. Most of the energy is radiated as heat.

MVA Corp., 830 Union Commerce Bldg., Cleveland 14.

•

SAFETY WATER HEATER provides a safe hot water temperature for washroom use — even with intermittent demand. It works from existing plant steam systems. T. G. McCann Co., Inc., 15 W. General Robinson St., Pittsburgh 12.

SERIES-SEQUENCES BALLAST permits positive starting on line voltages as low as 106 volts without shortening fluorescent lamp life. Variations in line voltage have no noticeable effect on lamp brilliancy. For full details write for catalog 254-511 to Jefferson Electric Co., Bellwood, Ill.

Pipe Repair CLAMPS

Made for every type of leak—any temperature or pressure. Send for Catalog No. 41-0.
M. B. SKINNER CO., SOUTH BEND 21, INDIANA

MOISTURE TESTING
Percentage of water in raw materials determined without electricity in 3 minutes. "SPEEDY" Moisture Tester proved accurate with Foundry Sands, Ceramics, Textiles, Grain, Flour, most raw materials. Proved effective and economical in 36 countries. Portable; inexpensive. Write for Lab. Test Reports and full particulars to
FS-1480, FACTORY MANAGEMENT
330 West 42nd St., New York 18, N. Y.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.
POSITION WANTED & INDIVIDUAL SELLING OPPORTUNITY undisplayed advertising rate is one-half of the above rate, payable in advance.
PROPOSALS, $1.50 a line an insertion.

INFORMATION:
BOX NUMBERS care of publication count as 1 line additional.

DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals.)

EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.

DISPLAYED RATE:
The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F.M.M.

NEW ADVERTISEMENTS received by Oct. 15th at the N. Y. office, 330 W. 42 St., N. Y. 18, will appear in the Nov. Issue, subject to limitation of space available.

Mfg. Representative wanted for quick process metal stampings—10 days to 2-week delivery on all stampings.

Prefer sales engineer. We produce stampings for electrical, airplane, instrument, camera or any machine stampings in small or large quantities.

Good commission.

Need representative in Milwaukee, Kansas, Houston, Chicago, and Omaha.

RW-1591, FACTORY MANAGEMENT & MAINTENANCE
520 N. Michigan Ave.
Chicago 11, Ill.

PLANT SUPERINTENDENT

Thoroughly versed in all phases of precision gear manufacturing procedure. Important know how to handle men. Age 40-50. Firm in business over 45 yrs. Metropolitan New York area.

Write education, background, experience and salary desired.

P1843 Factory Management & Maintenance
330 W. 42nd St., New York 18, N. Y.

Your Inquiries to Advertisers Will Have Special Value . . .

—for you—the advertiser—and the publisher, if you mention this publication. Advertisers value highly this evidence of the publication you read. Satisfied advertisers enable the publisher to secure more advertisers and — more advertisers mean more information on more products or better service—more value—to YOU.

REPLIES (Box No.):
Address to office nearest you
NEW YORK: 330 W. 42 St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

ASSISTANT SUPERINTENDENT, Machine and Forge division of an aggressive well established organization in the steel industry—Supervision approximately 300 employees. Steel rolling mill equipment, maintenance and production work. Machinist background—10-15 years with supervisory experience. High or trade school graduate, administrative ability. State age and salary desired in first letter. P-1791, Factory M&M.

WANTED PRODUCTION Engineer, experienced in time and motion studies, materials handling, improved operating methods, etc. Plant located in South, operating cotton mill, finishing plant and cutting up piece goods. Permanent position with attractive compensation and opportunity for advancement. State engineering education and experience, age, marital status, give references. Applications kept confidential if requested. P-1906, Factory M&M.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. D, 241 Orange St., New Haven, Conn.

EXECUTIVES—CONTEMPLATING a change? Your personal requirements met thru our flexible procedures, affording full protection of your present position. We have the know-how and the nationwide contacts to negotiate successfully for you. Details on request, mailed under confidential cover. Jepson Executive Service (Est. 1939), 1041 Porter Bldg., Kansas City 2, Mo.

POSITION WANTED

QUALITY CONTROL And Development Manager, 15 years textile supervisory experience in rubber industry. Manage textile laboratory, organize factory quality programs with full responsibility to establish specifications, material usage condition and guide production to high quality standards. Chemical Engr. background, likeable administrator, desire position in purchasing or quality management lines. PW-1959, Factory M&M.

FOR SALE

Factories.

Leonard J. Schrader, 509½ E. Green St., Champaign, Ill. Phone 9094.

SPECIAL SERVICE

Time Study Equipment

Boards with U.C.E.Z. transparent watch holders. Stop Watches. Pedometers, Slide Rules. Time Study forms in stock. Sample kit free. Oxnam Products Co., 5544 So. Homan Ave., Chicago 29.

WANTED

ANYTHING within reason that is wanted in the field served by Factory Management & Maintenance can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

SALARIED POSITIONS $3,500 — $35,000
We offer the original personal employment service (established 41 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars.
R. W. BIXBY, Inc. 276 Dun Bldg., Buffalo 2, N.Y.

EXECUTIVES AND TECHNICAL MEN
Desiring Positions with Stability
We solicit inquiries from qualified candidates who desire to contact employers for positions paying $5000 to $25,000 per year. Confidential Est. 36 years.
(Inquiries from Employers entail no obligation)
THE NATIONAL BUSINESS BOURSE
20 W. Jackson Blvd., Chicago 4

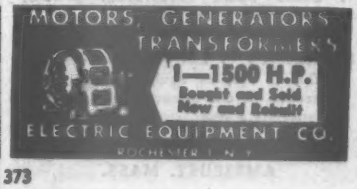
POSITIONS AVAILABLE
Factory Mgr. Mchy. $17,000; Sup't. Sheet Metal $12,000; Production Mgr. small parts $10,000; Chief Engr. Lite Mchy. $13,000; Industrial Relations Mgr. $11,000; Industrial Engrs. $500-$900; Chief Tool Engr. Production $14,000; Project Engr. Store Fixtures $9000+; Chief Engr. Ranges $12,000. Write for application. Employer pays fee most cases.
HARRISON PERSONNEL SERVICE
20 W. Jackson Blvd. Chicago 4

WANTED
Bridge Cranes
ARNOLD HUGHES COMPANY
765 Penobscot Bldg., Detroit, Mich.
WOodward 1-1894

FOR SALE
(Additional For Sale ads on page 372)

FOR SALE
ROTARY DRUM TYPE WASHER and DRIER. Ideal for metal parts. Complete with automatic controls, gas fired, with all safety devices. A-1 condition. Available immediately. We have outgrown its capacity. The machine may be seen at
WAGNER BAKING CORPORATION
15 Vesey Street, Newark, N. J.

FOR SALE
3 cab equipped overhead cranes. Manufactured by Whiting Corp. Two rated at 4½ ton, the other at 5 ton capacity. Each has three motors, with travel speed on rails of 300 ft. per min., racking speed across bridge of 125 ft. per min., hoisting speed of 45 ft. per min. Crane spans are 69 ft. 6 in., with a 25 ft. lift.
May be inspected at plant in St. Louis, Mo. Inquiries invited.
FS-1975, Factory Management & Maintenance
330 W. 42 St., New York 18, N. Y.



Additional Positions Vacant Advertising on pages 372 and 373

TRANSFORMERS
FOR SALE

1 Phase, 60 Cycle

3— 400 KVA W-H 13200—600/575/550
3— 333 KVA G-E 33000—2300/4000Y
3— 250 KVA W-H 13800—2300
3— 250 KVA Kuhl 8600—575
3— 200 KVA G-E 13200—120/240
3— 100 KVA G-E 33000—6900/11950Y
3— 75 KVA G-E 11500—230/460
3— 50 KVA G-E 33000—2400/4160Y
3— 50 KVA A-Ch 33000—2400/4160Y

3-Phase, 60 Cycle

3— 750 KVA W-H 13800—460 Dry Type
1—4000 KVA W-H 15000/12750 Auto

Many other items in stock

TRANSFORMERS WANTED

Reliable rewind and repair service on all makes of transformers.

THE ELECTRIC SERVICE CO.
CINCINNATI 27, OHIO

AIR COMPRESSORS
VACUUM PUMPS
AMERICAN
REBUILTS ARE BEST
RENT — SELL — BUY
Stationary — Portable
Electric — Steam — Gas — Diesel
All sizes — All Makes

PICK A COMPRESSOR

CFM	PSI	MFG. & SIZE
80	100	Worthington HB 6x5
136	350	American 8¼/3¾x8
196	135	Ingersoll ESI 8x9
210	100	American AF-1 9½x9
252	35	Worthington HB 10x7
262	75	Ingersoll ESI 10x9
594	20	Ingersoll ESI 15x9
570	100	IR-13-14x15 FSI
676	125	Worthington 15/9½x12
877	125	Ingersoll 17/10½x14

FOR RENT: ANY ONE OF OVER 250 COMPRESSORS IN STOCK

Since 1902
AIR RECEIVERS - AFTERCOOLERS
AMERICAN AIR COMPRESSOR CORP.
4700-4800 Dell Ave. No. Bergen, N.J.

OFFERING
BRIDGE CRANES
ARNOLD HUGHES COMPANY
765 Penobscot Bldg., Detroit, Mich.
WOodward 1-1894

FOR SALE

1—Johnson Liquid Level Control — with model P-200 B ¾" solenoid operated valve—used only one year.

1—L-3259 Bauer Proportional Multiple Feeder for Three Materials—new uncrated.

35—Boiler 2½" 7 foot fire tubes—unused. This is surplus equipment no longer needed in our operations. Make us a reasonable offer.

F. M. HOYT & CO., INC.
AMESBURY, MASS.

LOCKHEED
AIRCRAFT
CORPORATION
Georgia Division
Marietta, Georgia

Excellent opportunities for key positions in long range production program

CAN YOU QUALIFY?

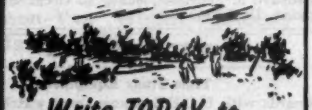
FLIGHT TEST ENGINEER
College degree, preferably in aeronautical engineering experience. Exceptional opening for qualified person with administrative and supervisory ability.

RESEARCH ENGINEER
Outstanding opportunity for man with Master's or Doctor's degree and 4 years actual experience in aircraft research and laboratory. Must have administrative ability.

DESIGN ENGINEER "A" and "B"
Must have aircraft design experience (structural, electrical & power plant.)

TIMEKEEPING GROUP SUPERVISOR
Must be familiar with IBM timekeeping system. Experience with large industrial payroll of several thousand employees essential. Accounting training or experience helpful.

Enjoy North Georgia's healthful year-round climate and famous scenic beauty . . . only 8 miles from Atlanta



Write TODAY to

Mr. Frank J. Johnson
Employment Manager
LOCKHEED AIRCRAFT CORP.
594½ Peachtree St. N.E.
Atlanta, Georgia

WANTED:
FACTORY MANAGER
ARE YOU THE RIGHT MAN FOR THIS HIGH PAYING POSITION

WHO: A good man familiar with the manufacture and assembly of electronic parts. This man should preferably have an engineering background. Experience in running a 300-500 man plant is essential because he must be capable of taking complete charge of plant production as factory manager. He must be organizationally minded and capable of getting the most out of people in the modern manner through leadership.

WHAT: There is an excellent opportunity for a capable and ambitious man to take over factory management in a medium-sized but growing manufacturing company in the electrical industry.

WHEN: The position is available immediately, but the manufacturer is fully aware of the time necessary to transfer from one job to another, or from one area to another, so they will work out plans mutually beneficial to both parties.

WHERE: The location of the plant is in a medium-sized city in Connecticut . . . excellent suburbs for pleasant living. Good shipping and receiving facilities.

WHY: The business is rapidly expanding and the executive vice president is handling the job at the present time but other responsibilities have been placed on his desk so he needs to be relieved of the factory manager's job. Peacetime markets are unlimited.

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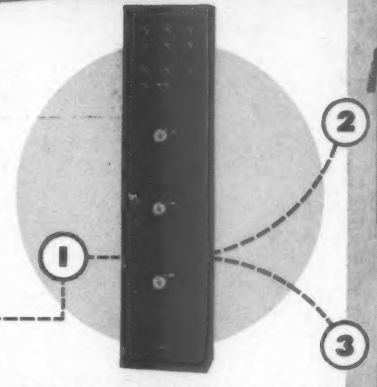

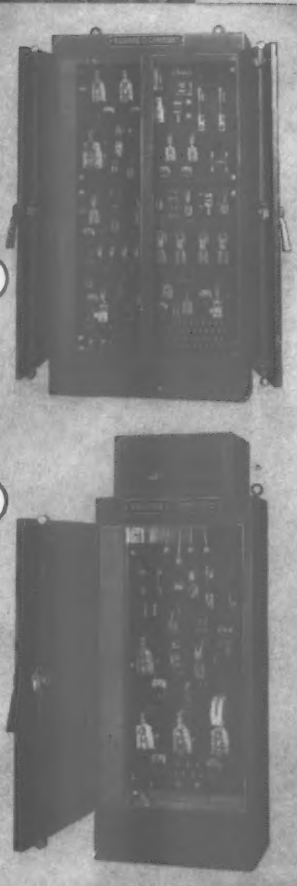

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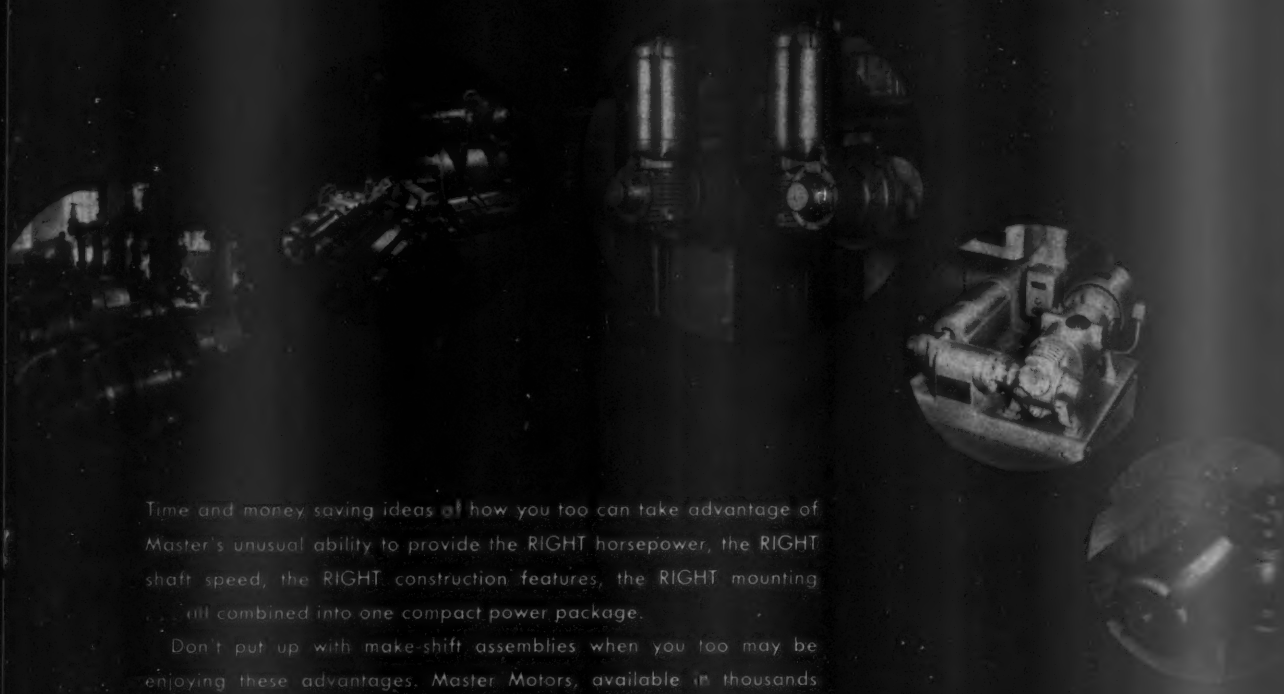

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